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BOARD OF PUBLIC WORKS.

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COMMISSIONERS.

BENJAMIN CARPENTER, *President.*
FREDERICK LETZ, *Treasurer.*
JOHN G. GINDELE.

OFFICERS.

E. S. CHESBROUGH, *Chief Engineer.*
A. W. TINKHAM, *Secretary.*

COMMISSIONERS' REPORT.

OFFICE OF THE BOARD OF PUBLIC WORKS,
CHICAGO, Feb. 24th, 1862.

To the Mayor and Aldermen of the City of Chicago, in Common Council assembled:

GENTLEMEN: In conformity with the requirements of the new charter organizing this department of the municipal government, we transmit herewith the annual report of the Board of Public Works.

The Board was organized May 6th, 1861. Suitable rooms had previously been provided in the Court House, and as soon as was practicable the rented offices occupied by the late Boards of Water and Sewerage Commissioners were vacated. All the city departments are thus gathered into one building, and it is a matter of considerable convenience to the citizens that the payment of the water tax and business with the water and sewerage departments, as with other departments under the care of the Board, can be attended to where the general city tax is paid, and where are the various offices of the city government.

By the terms of the act of organization, this Board is charged with the care of the Water Works, the Sewerage Works, the Public Parks and other public places of the city, the Streets, the River and Harbor, the Public Buildings, the Bridges, the Lamps and Lights for the lighting of the public places and buildings of the city, and with the direction of all the public improvements hereafter to be commenced by the city.

There have thus been transferred to this Board the duties of the Water Commissioners, the Sewerage Commissioners, the Street Commissioners, the City Superintendent, and of the Special Commissioners for the making of assessments.

The consolidation of the Water, Sewerage and Street departments, besides reducing the expenses of the city some eight thousand dollars in rents and salaries, has done away with the previous liability of collision of the three departments in carrying on their separate branches of duty. Under the present management by one responsible body, it is found in most instances where costly and permanent improvements are being made, that proper sewerage, gas, and water connexions can be made at one and the same time.

It is believed also that that provision of the charter which places all the improvements of the city under the care of one Board, and which requires the action of the Board upon all matters of special assessment, will be found to work for the public interest. All improvements to be paid for by general or special tax are thus subjected to an extended examination by the Board and by the Council, and of necessity all the steps preparatory to and during the progress of a city improvement, are systematized and made matters of record.

The report is arranged under appropriate heads corresponding with our books of accounts, which comprehend and specify the expenditures by the Board during the year.

As the last annual report of the Water and Sewerage Boards represented the state of the Water and Sewerage Works on the first day of January, 1861, the present report is intended, as far as is practicable, to exhibit the water and sewerage affairs for the whole of the year 1861. The report of operations in other departments under the care of the Board will go no farther back than the date of the organization of the Board—May 6th last.

WATER WORKS.

DISTRIBUTING PIPES.

Within the past year 13,761 feet of distribution pipes have been laid in the three Divisions of the city, at a cost of $12,008,11.

NEW MAIN.

The large main extending from the pumping works to the South Reservoir, (crossing the river below Rush street bridge), has been laid down and completed in accordance with the plan set forth in the last annual statement of the Board of Water Commissioners. The expectations of the Board in regard to this main are fully answered now that it is in use. The supply to the South and West Divisions is much improved. The supply of water is abundant, not only for ordinary uses, but for the extinguishing of fires if needed, and the danger of loss by fire is thus materially lessened. Apparently this increased supply is pumped with less cost than was the smaller amount formerly furnished. This agrees with the anticipations of the Board, and is due to the fact that the resistance to the flow of the water is much less with the larger than with the smaller main. The entire cost of this main was $49,032,53.

IMPURE STATE OF THE WATER.

The recent complaints of our citizens in relation to the impurity of the water at this time, have arisen from causes wholly beyond our control. The small fish of which complaint has been made are indeed a source of annoyance, but they can be guarded against by a small expenditure, arrangements for which will be completed in the Spring. But the prime cause of every serious complaint arises, in our opinion, (based upon careful examination), from the large quantities of blood and other waste and foul substances that find their way into the river from the many slaughtering and rendering establishments, distilleries and other works of a like nature, which, as all are aware, have increased to such an extent within a few years, as to render it necessary that proper steps be taken to prevent the yearly recurrence of the same difficulty.

The extension of the inlet pipe a mile further out into the lake would probably protect our citizens against the *frequent* repetition of this great nuisance; yet we are not confident that the remedy would be *complete*, for the reason that at certain periods the muddy and impure water of the river extends even beyond that distance from the lake-shore—although the impurity never could be as great as we now occasionally find it in the vicinity of our present inlet pipe. The cost of such extension would probably be from one hundred thousand to one hundred and twenty-five thousand dollars.

Admitting that this expenditure would improve the water for the *time being*, and also in the future, and that the present trouble arising from the causes stated above is thus remedied, the great evil *still remains*—to exhale its noxious vapors, and to endanger the health of our citizens. We cannot believe that it will long be suffered to exist, even if the inlet pipe shall be extended as suggested, and *when this* *nuisance shall be removed, there will be no longer a necessity for extending an inlet pipe thus far.*

There still remains sufficient doubts as to the *feasibility* of extending an iron pipe five feet in diameter so far out into the lake, to demand the most careful consideration before engaging in an enterprise requiring so large an outlay of money. The Board have no examples before them that afford proof of success, and it is believed that the *experiment* would be entirely novel—of laying a pipe of the required size so great a distance, where it must encounter the strength and violence of so large and boisterous a body of water as Lake Michigan. The doubts and difficulties that suggest themselves as we examine the subject may well induce caution and a thorough calculation of the obstacles to be encountered.

The last report of the Board of Water Commissioners very fully discussed the various projects proposed for obtaining water "free both from the wash of the lake shore and the flow of the river"—and a reference to their report at this time can be made with interest and profit. It will be found that some five different methods were more or less considered, one being the extension of the inlet pipe a mile out into the lake, already referred to. These different projects are given below.

1. The extension of the inlet pipe a mile out into the lake.

The estimates of the cost of this extension vary from about $66,000 to $125,000. The iron pipe alone would however cost nearly or quite the first sum, without the placing of the same on the lake bottom. The estimates are not presented as safe computations of the cost.

2. A brick tunnel six feet in diameter, and extending a mile out into the lake. Estimate of cost, $126,000.

3. Removal of the pumping works to Winetka, a distance of 16 miles north, where the shore rises 80 feet above the lake. The estimate of the cost of the pipes conducting the water from these new works to the city was $1,689,600—nearly double the cost of the present water works; and to this would have to be added the cost of the new pumping works, and the pipe extending into the lake, and the cost of a reservoir on the high grounds at Winetka.

4. Filter Beds, at an estimated cost of $107,500.

5. A subsiding reservoir, at an estimated cost of $107,775.

The city has still available the occasional pumping out of the river by the pumping works at Bridgeport, if as supposed, a suitable arrangement could be made with the Canal Company for doing the pumping. Such an use of these works for the purifying of the river was anticipated by the Sewerage Commissioners, as will be seen by reference to their reports, and particularly to that of July 1, 1860. It is probable that some four or five days pumping, at a cost of about $150 per day, would correct the present offensive state of the river. The remedy would of course be but temporary in its effects, but while in operation, we feel confident, would prevent the recurrence of the serious annoyance, to which we have been subject during the present winter. Although the daily expense, when deemed necessary to employ the pumps, would be as stated, some $150, it would enable the Board to avoid the increase of the city debt, to the extent required to extend the inlet pipe into the lake, and answer the double purpose of improving the water, and also of *purifying* the river—which latter is quite as important to the well being of our city, as the advantage to be derived from the former.

The Board are continually extending their investigations, and particularly for the purpose of ascertaining how far up and down the lake the effects of the discharge from the river can be traced. Besides the projects already referred to, it is proper to say that consideration has been given to one or two other plans, which at present are not sufficiently matured for the Board to express an opinion as to their merits. One of these is the making of a sort of filtering reservoir on the lake shore, a mile or two north of the city limits, from whence the water will be conducted to the present pumping works, to be elevated as is now done. Such a reservoir should be located within 150 to 200 feet of the lake shore, or so near that the water will filter through the intervening bank of sand and gravel so rapidly, that to hold several days' supply, the reservoir required will not be excessively large. It is proposed to conduct the water thence to the present works in a brick aqueduct, the water to be pumped from the reservoir to the aqueduct by a small steam engine. Such filtering reservoirs are in use in several places—one being in Hamilton, Canada West—although it is not known that there are any furnishing so large a quantity of water as is needed for the supply of this city. Observations made as to the quality of the water at the suggested location of the reservoir, failed to discover there any trace of the effects of the discharge from the river.

Should the Council recommend the *total* discontinuance of the

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towns, wash out these soluble substances it contains, carry them into the soil, and through this, by degrees, to the wells by which the wants of the inhabitants are supplied. This has often been productive of serious and fatal diseases. It shows, therefore, the propriety of preventing, as far as possible, the accumulation of refuse; and, where such accumulation is unavoidable, of placing it at the greatest distance from wells which yield water for daily use. And especially it shows the necessity of bringing water from a distance for the supply of large cities.

In the neighborhood of grave-yards water may become adulterated with undesirable admixtures. The water of a well, close to an old church-yard, has been found to contain as much as 100 grains of solid matter to the gallon, more than one half consisting of *nitrates*, traceable to the neighboring grave-yard. Such compounds are generally produced where animal matters decay in porous soils.

The following table exhibits the proportion of organic matter (also mineral matter), found in certain well known English and American waters, arranged in the order of their purity in reference to organic matter:

	Croton hydrant water, N. York.	Schuylkill water Philadelphia,	Chicago water—No. 16.	Fresh pond water, Cambridge, Massachusetts.	Cochituate water, Boston.	Mean of 4 English Rivers.	Chicago water—No. 23.	Thames water at London Bridge,
MINERAL MATTER,.........	3.70	4.25	6.74	5.00	1.69	14.49	16.06	17.58
ORGANIC MATTER,.........	.46	1.24	1.27	1.35	1.43	2.15	4.69	5.83
Total Solid Matter,	4.16	5.49	8.01	6.35	3.12	16.64	20.75	23.36

Thirdly, *Gaseous Substances.*—These were found to be oxygen, hydrogen, carbonic acid gas, and sulphuretted hydrogen. The first three were in all the samples of water examined. They are, indeed, in nearly all natural waters. Traces of sulphuretted hydrogen were detected in Nos. 20, 21, 22 and 23, generated from the decomposition of the animal matter which they contained.

Fourthly, *Sedimentary Substances.*—All the samples contained sedimentary matter. The respective amounts appear in table B.

All which is respectfully submitted,

BLANEY & MARINER,

Chemists.

TABLE A.

No. of Water,	1	2	3	4	5	6	7	8	9	10	11	12
Organic Matter,	2.8794	1.7171	1.9180	1.6917	1.7435	2.0688	1.9280	2.2521	2.0086	1.9543	1.6111	1.7707
Mineral Matter,	10.5771	10.1285	8.7965	7.4212	7.3093	7.5409	7.9966	8.4502	7.3435	9.8851	8.7825	9.0782
Total Solid Matter,	13.4565	11.8456	10.7145	9.1129	9.0528	9.6097	9.9246	10.7023	9.3521	11.8394	10.3936	10.8489
Sulphuric Acid,	.3596	.3101	.1898	.1969	.1713	.1744	.1666	.2088	.1700	.3518	.2199	.2295
Sodium and Potassium,	.2432	.2311	.2088	.2472	.2435	.3734	.3867	.2778	.2359	.2226	.1978	.3077
Chlorine,	.0754	.0372	.1534	.1398	.0420	.0971	.0250	.0909	.1089	.0596	.0633	.0662
Silica,	4.1445	4.0756	2.6665	.9536	1.0724	1.4350	1.6263	1.5091	1.2606	1.4010	.9381	1.5291
Lime,	2.5892	2.3364	2.2867	2.3947	2.1185	2.5676	2.2960	2.4148	2.5413	2.9055	3.1848	2.8252
Magnesia,	.5887	.6311	.7684	.7854	.7730	.7283	.9289	.9854	.7124	.8460	.7437	.9505
Per-Oxide of Iron and Alumina and Phosphates,	.4197	.1327	.3086	.1636	.3039	.0231	.0185	.1420	.0988	.0895	.1157	.4552
Carbonic Acid (combined,)	2.4619	2.3865	2.5099	2.5094	2.3928	2.6963	2.7006	2.8312	2.6612	2.9695	3.1727	2.0395
No. of Water		13	14	15	16	17	18	19	20	21	22	23
Organic Matter,		1.4158	1.4653	1.9909	1.2727	2.2785	2.4467	1.7956	4.3422	4.1247	4.5965	4.6941
Mineral Matter,		8.3729	8.5318	8.1495	5.9593	8.1398	9.2461	7.4315	15.2823	17.2659	18.0115	14.7507
Total Solid Matter,		9.7887	9.9971	10.1404	7.2320	10.4183	11.6928	9.2271	19.6245	21.3906	22.6080	19.4448
Sulphuric Acid,		.3040	Trace	.2561	.3024	.4397	.4660	.1960	.3703	1.3131	1.2282	.7190
Sodium and Potassium,		.1501	.2191	.2129	.1389	.3965	.3456	.2393	1.1295	1.2581	1.3517	1.0651
Chlorine,		.0375	.0642	.1529	.2083	.0298	.2392	.1134	.3796	.0214	.4209	.1449
Silica,		2.5552	2.7681	1.7930	.3512	1.5507	2.6493	1.5430	2.0701	2.9764	6.3001	3.3992
Lime,		2.8176	2.7882	3.0053	2.4796	2.2682	2.1124	1.5106	3.6368	4.3759	3.3653	3.6538
Magnesia,		.3472	.5748	.5956	.6789	.6589	.8517	.7052	1.7096	1.9010	.3979	1.7544
Per-Oxide of Iron, and Alumina and Phosphates.		.1173	.0694	.0197	.0756	.2376	.1389	.1944	.3450	.3561	.3009	.6342
Carbonic Acid, (combined,)		2.4160	2.8023	2.8541	2.5043	2.2413	2.3096	1.8394	4.4728	4.7385	2.9239	4.3421

TABLE B.

No. of Water,....................	1	2	3	4	5	6	7	8	9	10	11	12
Sulphate of Lime,..............	.6113	.5272	.3227	.3332	.2912	2965	.2832	.3541	.2890	.5981	.3738	.3901
Carbonate of Lime,...........	4.1731	3.7843	3.8460	3.9312	3.5689	4.3669	3.8917	4.0518	4.3255	4.7485	5.4123	4.6352
Carbonate of Magnesia,......	1.2150	1.3026	1.5861	1.6210	1.5956	1.5032	1.9172	2.0338	1.4704	1.7462	1.5350	1.9618
Silica, ...	4.1445	4.0756	2.6665	.9536	1.0724	1.4350	1.6263	1.5091	1.2606	1.4010	.9381	1.5291
Per-Oxide of Iron, Alumina and Phosphates,	.4197	.1327	.3086	.1636	.8039	.0231	.0185	.1420	.0988	.0895	.1157	.4552
Chlorides of Sodium and Potassium,	.1242	.0613	.2528	.2304	.0692	.0600	.0412	.1498	.1794	.0982	.1373	.1421
Organic Matter, ...	2.8794	1.7171	1.9180	1.6917	1.7435	2.0688	1.9280	2.2521	2.0086	1.9543	1.6111	1.7707
Soda. (combined with Organic matter,)	.2621	.2792	.1476	.2112	.2917	.4188	.4997	.2953	.2230	.2482	.1940	.3396
Total Solid Matter,......	13.8293	11.8800	11.0483	9.1359	9.4364	10.1723	10.2058	10.7880	9.8553	10.8840	10.3173	11.2238
Free Carbonic Acid,(cub.in.)	9.8243	12.2632	8.4235	10.0004	8.1298	8.9394	7.1503	5.7201	5.7231	6.2491	10.5524	12.6058
Sedimentary Matter,..........	4.9633	2.8725	1.7833	3.1055	3.2244	3.2403	4.4372	2.9404	....	....	....	....

No. of Water,....................	13	14	15	16	17	18	19	20	21	22	23
Sulphate of Lime,..............	.5168	Trace	.4354	.5141	.7475	.7922	.3332	.6295	2.2323	2.0879	1.2223
Carbonate of Lime,...........	4.6514	4.9789	5.0464	4.0498	3.5007	3.1896	2.4525	6.0314	6.1726	4.4743	5.6259
Carbonate of Magnesia,......	.7166	1.1863	1.2293	1.4013	1.3599	1.7580	1.4554	3.5167	3.9236	1.8525	3.6211
Silica,............................	2.5552	2.7681	1.7930	.3512	1.5507	2.6493	1.5430	2.0701	2.9764	6.3001	3.3992
Per-Oxide of Iron, Alumina and Phosphates,	.1173	.0694	.0197	.0756	.2376	.1389	.1944	.3450	.3561	.3009	.6342
Chlorides of Sodium and Potassium,	.0618	.1058	.2520	.3433	.0491	.3942	.1869	.6256	.0358	.6936	.2388
Organic Matter,.................	1.4158	1.4653	1.9909	1.2727	2.2785	2.4467	1.7956	4.3422	4.1247	4.5965	4.6941
Soda, (combined with Organic Matter,)	.1397	.2394	.1535	.0053	.5088	.2571	.2236	1.1917	1.6782	1.4554	1.3100
Total Solid Matter,......	10.1746	10.8132	10.9202	8.0133	10.2328	11.6260	8.1846	18.7522	21.4992	21.7612	20.7456
Free Carbonic Acid,(cub.in.)	7.3262	8.0594	8.7926	7.4115	10.4251	10.5067	12.3286	14.1765	24.7356	26.3973	22.2541
Sedimentary Matter,.........	.3564	.2973	.3544	.1882	.8023	.6789	1.8515	2.0047	2.6435	5.0659	4.3556

REMARKS.—No. 1 is colored by organic matter; so also are Nos. 8, 20, 21, 22 and 23. Nos. 20, 21, 22, and 23, on standing, became fetid and turbid, from the decomposition of animal matter, but finally purified themselves by spontaneous fermentation, becoming clear and odorless, and not unpalatable.

The following is a description of the points from which water was taken for analysis by Messrs. Blaney and Mariner:

DATE.	NO. OF SPECIMEN.	WHENCE TAKEN.	REMARKS.
1861.			
April 17	No. 1	1,000 feet from Cleaverville..	Surface of Lake.
" "	" 2	One mile out from Cleaverville.....	" " "
" "	" 3	One mile out from Cleaverville.....	Bottom of Lake.
" "	" 4	One mile out from Engine House..	Surface of Lake.
" "	" 5	One mile out from Engine House..	" " "
" "	" 6	1,000feet out from Engine House	" " "
" "	" 7	Near the Light House...............	" " "
" "	" 8	Near Clark street Bridge...........	When the above specimens were taken the lake was somewhat agitated by wind, and there appeared to be a dark belt extending northwardly from the mouth of the river.

The following specimens were collected at the Engine House by Mr. Cregier:

DATE.	NO. OF SPECIMEN.	WHENCE TAKEN.	REMARKS.
1861.			
May 20	No. 9	Engine House.......................	
June 3	" 10	Engine House..........................	
Aug.	" 11	From "dead ends" north of pumping works......	
"	" 12	From "dead ends" north of pumping works..........................	
Sept. 20	" 13	300 feet from breakwater at Engine House...............................	Surface of Lake calm.
" "	" 14	1 mile from breakwater at Engine House	Bottom of Lake wind N E rough.
" "	" 15	1 mile from breakwater at Engine House	Surface of Lake wind N E rough.
" "	" 16	2 miles from breakwater at Engine House	Surface of Lake wind N E very r'h
Oct. 18	" 17	Wallis' lower story tap, Lake near Clark street.........................	A peculiar rain water appearance
" "	" 18	Inlet in basin at pumping works...	
Oct. 22	" 19	From "dead end" on Milwaukee Av.	
Nov. 19	" 20	From South branch at Old st. Br.	
" "	" 21	From South branch at Van Buren street Bridge......................	
" "	" 22	From river at Clark st. Bridge.....	
" "	" 23	From North branch at Chicago Avenue Bridge......................	

The report of the Chief Engineer of the Board, E. S. Chesbrough, accompanying and submitted with this, treats quite fully of the state of the water, and the Council will find it of interest to refer to it in connection with our own remarks on the same subject.

INCOME AND EXPENSES OF THE WATER WORKS.

The income of the year from water rents, and including the small sum received as profits for tapping the pipes, has fallen a little below that of last year.

Income of 1861 from water rents and tapping pipes	$131,035 10
" " 1860 " " " " "	$131,536 34
Repairs and operating expenses 1861	$36,403 16
" " " 1860, including $2,557 61 for the cost of the new chimney and smoke pipes	$40,244 08
Interest 1861	$82,011 27
" 1860	$71,474 91

The increase of the cost of interest for the year 1861 is due mainly to the loss on the Chicago Marine & Fire Insurance Cos. account with the Water Commissioners, amounting to $8,095 97.

The whole income of the works from their commencement amounts to	$744,244 19
The interest and operating expenses for the same time amounts to	$689,110 61
Total excess of revenue	$55,133 58
The excess of the year 1861 was	$12,620 67

WATER ASSESSMENTS.

The method of enforcing the collection of assessed water tax on buildings within the water district, but not connected by service pipes with the street mains, is laborious and expensive both to the city and the parties assessed. We are of the opinion that the tax should be made as low as will be consistent with other water rates—lower than it generally is now—and that it should become a lien in all cases on the lots bearing the buildings assessed. We are also of the opinion that all property benefited by the introduction of the water pipes, should be taxed in proportion to the benefit received, and in this class we include all lots vacant or occupied fronting on the streets where the pipe is laid. We invite your attention to the remarks of Secretary on this subject.

METERS.

The Board are introducing Meters from time to time for the determination of the water rates of large consumers. It is our own experience as of Boston, New York, and other cities, that Meters afford the only just means of assessing parties using large quantities. Such parties have heretofore been assessed by an estimate of the amount used, and so long as there is no inducement for the consumer to limit his use of water to his real necessities, it is almost always found that the estimated amount is much too small. We have now some twelve Meters, and have ordered others with the intention of applying them to the large hotels, breweries, and manufacturing establishments.

The rates determined by Meters during the year 1861, amount to about four thousand dollars.

PURCHASE OF PIPES FOR FUTURE WANTS.

A contract has been made with Messrs. R. D. Wood & Co., of Philadelphia, for some 400 tons of 4, 6, and 8 inch pipes for furnishing with water such parts of the city as are in urgent need of it, and for filling up certain gaps for the improvement of the supply to pipes already laid.

SEWERAGE DEPARTMENT.

There are now laid in the city 54¼ miles of public sewers. The state of the Sewerage Funds has prevented any considerable extension of the Sewers during the year, but the works have been kept in good repair throughout, and are now everywhere serviceable and in general good order.

The few sewers that have been laid during the year, have generally been built by means advanced by individuals benefited by their construction.

The cleaning and repairs of the sewers for the year 1861 has cost $8,425,79. Considering the extent of the sewers, this amount is certainly not large, but it is the hope of the Board that it may be even less than this amount during the present year.

Besides the public sewers, of which we have already given the extent, there are in connection with them 2,437 private drains, constructed under the supervision of the Sewerage Board. Mr. W. H. Clarke, besides his other duties as Assistant Engineer of the Board, has the special charge of private drains.

The Board has now no resources for the construction of sewers. There is in the Marine Bank the balance to the credit of the late Sewerage Commissioners of $58,882,84, which the bank has refused to pay at par, and for which suit has been commenced.

The balance of account charged to S. Lind, Treasurer of the late Board, is $107,746,53. Suit has been commenced against the Sewerage Commissioners and their bondsmen to recover the balance due from them.

The report of the Chief Engineer of the Board will supply our own lack of details, and to this we beg to refer the Council for a more full account of all matters pertaining to the construction and working of the sewers during the year.

GENERAL CITY DEPARTMENT.

STREETS AND SIDEWALKS.

The limited means, within the control of this Board, entirely prevents any expenditure, beyond ordinary repairs, and the cleaning of streets and gutters. The new Charter provides that all improvements of streets, and the building and repairing of sidewalks, shall be made by special assessment, upon the abutting property, and this on petition of three-fourths of the property-holders—(except where some urgent necessity shall exist—when it may be done on the recommendation of the Board, and the concurring vote of three-fourths of the Common Council.) By the operation of this law we are prevented from making many necessary repairs, that are loudly called for by our citizens, until the necessary means can be raised, by general tax, or special assessment; and under the existing embarrassment, that has prevailed during the past year, we have felt disinclined to undertake new improvements, unless called upon to do so by an unmistakable majority of those persons who were to be called upon to foot the bills, and have petitioned therefor. Among the improvements which have been undertaken, and that seemed to require immediate attention, are Lake street, the east end of South Water street, Monroe street from Clark to State, and North Wells street from the bridge to Green Bay Road. The first named improvement has been completed from Lake street bridge to the east line of Wabash Avenue. The short space between Wabash Avenue and Central Avenue is under contract, and will be finished as soon as practicable. South Water street, from Dearborn street to River street, has also been brought to grade, and paved with stone block paving. The Monroe street and North Wells street improvements will be put under contract as soon as the ground settles and is in a suitable condition.

All the leading thoroughfares from the country into the city are in very bad condition—particularly Milwaukee Avenue, Blue Island Avenue and Green Bay Road—and cannot be kept in passable condition with the small fund that arises from street taxes and the usual appropriation for street repairs. The old plank are almost entirely worn out, and in many places removed, leaving impassable holes during the muddy weather. These leading streets cannot be improved satisfactorily to the public, and in a manner to meet the increasing travel or business over the same, without making an assessment upon the abutting property. The owners of property thereon have hitherto refrained from petitioning for the required improvement, for the reason that they have felt unable to meet the assessment. But the time has arrived when patching will not answer the purpose, and permanent improvements of some kind (either of gravel or McAdam), should be made without further delay.

The opening of Dearborn street from Madison to Monroe street, and the removal of the old buildings thereon, was undertaken by the Board early in the season, and assessment made, and sale ordered of the buildings. The sale has been postponed by injunction on two several occasions. The Board now await the decision of the Court on the last writ, and when decided will again proceed in the work of opening the same, which is so urgently demanded by our citizens.

That the streets and sidewalks of the city may be under proper supervision, the Board has divided the different divisions of the city into suitable districts, and has appointed a foreman for each district. For the care of the sidewalks there is one foreman in each division. For the care of the streets there are generally two foremen in each division.

Besides the street taxes worked out, there has been expended on the streets and sidewalks since the organization of the Board and during 1861 the following sums:

South Division,		$5,719 48
West	"	7,576 68
North	"	5,015 21

PUBLIC BUILDINGS.

The Board has expended on the various public buildings of the city the sum of $1,485,57, most of which was spent on the engine houses.

BRIDGES.

There are sixteen bridges under the care of the Board, all of which are in good repair. No unusual outlay is anticipated in this department during the coming year.

HARBOR AND PUBLIC PARKS.

The sum appropriated by the Council for these objects was inconsiderable, and the expenditures on them have been limited to what was absolutely necessary to preserve them from injury.

CEMETERY.

The cemetery grounds have been greatly improved in appearance by the work of the past year, and we trust to the gratification of the citizens generally as of the Board.

In the cemetery proper the roads have been improved by grading, filling with clay, and covering with gravel, so as to make good carriage drives. Trees have been planted along the sides of the drives, and the sidewalks divided from the roadway by a strip of sodding. The fence around the cemetery grounds has been put in repair, and at the entrance to the cemetery a small fountain has been erected.

Perhaps as general an interest will be felt in the work done in that part of the grounds lying north of the cemetery proper, and which has not yet been subdivided into lots. Here are some 40 acres of public grounds of diversified surface, bordering on the lake, covered with a young growth of wood, and affording to the city the promise of an attractive park, at a small expense. Without any large expenditure here, a good deal has been accomplished in giving the grounds an inviting appearance, and by trimming up and thinning the young trees, to secure a good growth and shape to such as are left standing. A gate has been built in this part of the grounds, and several small bridges thrown across the county ditch flowing through the grounds and discharging into the lake. Continuous drives will be made through the cemetery and park, and the grounds made a pleasant place of resort for parties either walking or riding.

It is very desirable that these improvements should not be arrested here, and as the funds with which they have been made are nearly exhausted, that means be provided for their further progress.

The charge of the cemetery grounds, as of the public parks of the city, have been in the hands of Mr. John C. Ure.

The total expenditure by the Board at the cemetery amount to $3,005,90.

The details of all expenditures by the Board are presented in their accounts accompanying the report of the Secretary.

All of which is respectfully submitted,

BENJ. CARPENTER, }
FRED. LETZ, } Board of Public Works.
J. G. GINDELE. }

REPORT OF THE CHIEF ENGINEER.

CHICAGO, Feb. 24th, 1862.

To the Board of Public Works:

GENTLEMEN: Your Engineer would respectfully present this, his first annual report:—

When first appointed, he had charge only of the construction and maintenance of the sewers, his other duties being simply those of consulting engineer. Since then you have placed the construction and repairs of the Water Works under his charge.

As the Water Department is older than that of Sewerage, it will be natural to speak first of the

WATER WORKS.

No report on them having been made since that of Jan. 1, 1861, by the officer then in charge of them, Superintendent Walker, it will be necessary to include in this statement what was done under the direction of Mr. Walker, between the first of January and the time of the new organization of this department.

CONDITION OF THE WORKS.

The water works are believed to be in as good a condition as ever before, saving the exceptions below mentioned and the natural wear and tear inseparable from their use, and the inevitable decay which the materials they are composed of must suffer.

Although several accidents have occurred during the year, fortunately it has not been necessary in repairing any one of them to deprive the whole city of water a single minute, although large districts have been cut off for several hours. Whenever it has been practicable, these repairs have been made at such an hour of the day, and sometimes of the night, as to cause the least inconvenience to large hotels, manufacturing establishments using steam engines, &c.

PUMPING WORKS.

These are in excellent condition and have required no unusual repairs during the year. The report of the Engineer in charge of them gives a full and satisfactory statement of their condition and performances during the year 1861.

REPORT OF THE ENGINEER OF THE PUMPING WORKS.

Engine House C. W. W.,
January 1st, 1862.

E. S. Chesbrough, Esq.:

Sir: The usual Annual Statement of matters connected with the Pumping Works, for the year ending December 31st, 1861, is herewith respectfully submitted.

It will be seen the quantity of water distributed the past year is but a trifle more than was pumped in 1860.

The amount pumped in 1859 over 1858 was equal to 29½ per cent., and the quantity pumped in 1860 over 1859 equaled 21¼ per cent.; while 1861 exceeded 1860 only about 3 per cent.

The trifling increase of the past year over 1860 may be accounted for to some extent by the fact that in 1860 it was necessary to waste a considerable amount of water at the Engine House, while through the past year the waste in the same quarter has been comparatively small, and since the completion of the new main, the necessity for wasting has been entirely obviated.

Causes other than those alluded to perhaps exist for the slight difference which appears in the amount pumped in 1861 over 1860, but they exist entirely outside of the pumping works.

The following table will show the quantity of water pumped each month of the last four years:

MONTHS.	1858.	1859.	1860.	1861.
January,..............	81,538,179	106,905,665	132,284,454	137,651,918
February, ...	69,426,515	106,401,412	130,800,720	142,071,067
March,............ ...	82,677,463	102,415,983	150,331,680	135,576,447
April,.................	82,600,782	89,994,235	132,930,546	128,371,178
May, ...	82,279,920	116,107,263	141.171,078	150,489,168
June,.........	90,211,505	113,098,416	148,197,024	155,996,352
July, ...	101,670,736	133,800,336	166,394,640	147,182,793
August,................	107,176,652	123,266,556	152,427,690	168,602,494
September,...........	108,534,540	131,735,847	132,272,202	152,710,186
October,................	101,046,605	141,527,040	148,710,195	149,362,166
November,...........	86,385,840	127,342,018	150,493,248	153,879,648
December,..............	98,316,722	122,653,139	130,773,075	145,261,272
Totals,.........	1,091,865,457	1,415,147,910	1,716,786,552	1,767,154,689

It will be seen that 1,767,154,689 gallons have been pumped the past year. Of this amount

The large engine pumped	1,072,485,120 galls.
The small " "	694,669,569 "

The engines have been in operation the past year 5,967 hours and 44 minutes, which is an average of 16 21-60 hours of each day throughout the year.

The amount of coal consumed the past year is 2,431 653-2000 tons, which is about 190 tons less than was consumed in 1860. This decrease may be attributed in part to the superior condition of the small engine, resulting from the new steam piston which was attached in the latter part of 1860, also to the benefits derived from the enlarged "main," and perhaps the character of the coal, which as a general thing was of better quality than that received in 1860.

Of the foregoing amount of coal 116 1165-2000 tons is due to the

necessity of stopping the engines at different times through the day when the reservoirs are full, it being consumed for the purpose of keeping up steam when the engines are at rest. These stops have occurred 607 times the past year, consuming nearly 400 lbs. of coal each time.

The limited capacity of the reservoirs makes it necessary to keep fire in the boilers continually, the fires not having been out in nearly eight years.

The following tables will show in detail the operations of the engines and boilers for the past year.

Large Engine.

Months.	No. of days run.	No. of hours and min. run per month.		Av. No. h's and min. run p day		Average No. of gallons pumped per day.	Whole number of gallons pumped per month.	Pounds of Coal used for pumping.	Pounds of Coal used for keeping steam.	Total pounds of Coal consumed.	Number of revolutions made.
		H	M	H	M						
January	7	109	39	15	40	4,903,810	34,326,672	102,800	5,800	108,600	42,067
February	26	415	38	15	59	5,187,752	134,881,536	387,300	19,900	407,200	165,296
April	16	211	52	13	14	4,455,411	71,286,576	189,000	12,000	201,000	87,361
May	31	436	04	14	04	4,854,489	150,489,168	350,400	24,800	375,200	184,423
June	30	465	30	15	31	5,199,878	155,996,352	400,050	22,500	422,550	191,172
July	3	43		14	20	5,037,984	15,113,952	36,600	1,975	38,575	18,522
August	21	342	13	16	18	5,492,303	115,338,336	283,935	12,925	296,860	141,346
September	24	379	37	15	49	5,145,798	123,499,152	338,210	14,525	352,735	151,347
October	10	149	25	14	57	5,374,992	53,749,920	134,110	7,470	141,580	65,870
November	30	421	46	14	03	5,129,321	153,879,648	385,090	23,700	408,790	188,578
December	13	168	52	12	59	4,917,216	63,923,808	164,933	12,120	177,053	78,338
Totals	211	3,143	36				1,072,485,120	2,772,428	157,715	2,930,143	1,314,320

Small Engine.

Months.	No. of days run.	No. of hours and min. run per month.		Av. No h's and min. run p d'y		Average numb'r gallons pumped per day.	Whole number of gallons pumped per month.	Pounds of Coal used for pumping.	Pounds of Coal used for keeping steam.	Total pounds of Coal consumed.	Number of revolutions made.
		H	M	H	M						
January	24	432	43	18	02	4,305,219	103,325,246	275,800	13,050	288,850	199,162
February	2	29	20	14	40	3,594,765	7,189,531	20,600	1,300	21,900	13,858
March	31	561	22	18	07	4,373,434	135,576,447	380,700	15,500	396,200	261,327
April	14	236	20	16	53	4,077,472	57,084,602	158,700	7,200	165,900	110,032
July	28	530	44	18	57	4,716,744	132,068,841	346,650	12,850	359,500	254,566
August	10	213	29	21	21	5,326,416	53,264,158	137,540	3,100	140,640	102,668
September	6	120	21	20	03	4,868,506	29,211,034	75,540	2,350	77,890	56,305
October	21	390	06	18	35	4,552,964	95,612,246	241,890	8,400	250,290	184,295
December	18	309	43	17	12	4,518,748	81,337,464	219,640	11,700	231,340	156,780
Totals	154	2824	08				694,669,569	1,857,060	75,450	1,932,510	1,338,993

Recapitulation.

Engines.	Number of days	No. of hours.		Galls Pumped.	Pounds of Coal consumed for pump.ng	Pounds of Coal consumed for steam.	Total pounds of Coal consumed.	Number of revolutions.
		H	M					
Large	211	3,143	3	1,072,485,120	2,772,428	157,715	2,930,143	1,314,320
Small	154	2,824	08	694,669,569	1,857,060	75,450	1,932,510	1,338,993
Totals	365	67	44	1,767,154,689	4,529,488	233,165	4,862,653	2,653,313

The greatest amount pumped in one day by the large Engine was on August 17th, 6,072,672 gallons, running 17 hours and 10 minutes. The least quantity pumped in one day was on January 25th, 3,769,920 running 12 hours and 5 minutes.

The largest amount pumped in one day by the small Engine was on August 3d, 5,427,686 gallons, running 21 hours and 40 minutes. The smallest amount pumped in one day was April 14th, 3,531,141 gallons, running 15 hours and 25 minutes. This Engine was in operation without stopping 46 hours and 51 minutes, on the occasion of an accident to a large stop valve on the main pipe.

The daily average amount pumped for the year is 4,841,520 gallons.

I am enabled to reiterate the statement made one year ago in regard to the general condition of the engines, boilers, &c.

Throughout the past year they have proved *loyal,* no breakage of any kind having occurred, and up to this time they are in fair working order.

No repairs have been done the past year either upon the engines or boilers, beyond the usual attention demanded by all machinery of a like class, which of course has been performed by the regular employes. Perhaps the extent of repairs can be best judged by the amount expended therefor, a knowledge of which I am not in possession of, but I presume from the character thereof that the expenditure will be found trivial. In view then of the slight repairs which have been heretofore bestowed upon the present engines, it may not be out of place here to enquire briefly if justice can be done them in the future in regard to repairs, without a risk to the supply of water; for it must be borne in mind that the past should not be a criterion for the future, from the fact that all machinery, however well constructed, will in time require repairs of a general character, especially engines which have been in operation as much of the time as ours; and it must be remembered also that the extension of the works in other departments demands from the engines a corresponding increase of duty.

One of the engines has been in operation about eight years; the other five years. Through these periods it has been the design to keep them up to the standard of "good order;" to continue this standard it will soon be necessary to give attention to certain parts which can not be reached under ordinary circumstances, and it may also become necessary to detach important parts of the engines and remove them a distance from the works, in order to bestow proper repairs. This of course would require a considerable time, in which case we must depend upon one engine. A contingency has never yet occurred by which either of the engines has been disabled, and it is perhaps unnecessary to anticipate one; still in view of what has been stated, and with the knowledge that the reservoirs when full will contain (with extra economy), only about six hours supply, it may be said that we are not as well fortified against a failure in the supply of water as precedent would seem to show. A third engine, or even an increased reservoir capacity, would be likely to place us beyond the probability of a failure. To do justice to an extension of this character would perhaps consume eighteen months or two years.

On the 22d of June a portion of the well wall was removed for the purpose of connecting the new 24-inch main to the large engine, involving a small expense for the alteration of feed pipes, &c. Water was let into this pipe for the first time on the 3d of October. Most of the time since then it has been in use.

Water has been furnished to the "Ogden Skating Park" 14 hours through a 4-inch hydrant, and to the "Union Skating Park" 9 hours through a 2½-inch hydrant.

I would respectfully call attention to the general condition of the main building of the pumping works, which needs some repairs, especially the north wall, which is badly cracked in the vicinity of the steam pipe.

The list of tools remains about the same as last year, with the exception of small stores, which will be found appended.

There has been no change in the force employed on this part of the works the past year, most of whom have been connected with this department for several years.

Respectfully,

D. C. CREGIER, *Engineer.*

The remarks of both Mr. Walker and Mr. Cregier in their last annual reports, as well as those of Mr. Cregier in his present one, relative to the effect of the constant increase of consumption upon the small engine, by requiring a higher speed, and thus increasing the probability of accidents to it, are worthy of serious consideration. When the ordinary speed of an engine is increased beyond a certain rate, the probability of breakage increases much more rapidly than the rate of speed. This will become apparent when it is remembered that at a very slow rate the risk of breakage is practically nothing, while at a very high rate, breakage sooner or later must take place.

The continued depression of the manufacturing interests of the city, together with the small number of new buildings erected during the year, has caused a much smaller increase of consumption than would have taken place under more prosperous circumstances, and thus the danger to be apprehended from being obliged to run the small engine at a higher speed, is not so great as it was feared a few years ago it might now be. The laying of the new main, too, has diminished the head against which the engines have to pump. Although this cannot diminish the rate of speed at which the engines must work, it does diminish the strain upon them and consequently their liability to break. Had the rate of consumption increased as much in 1861 as it did in 1860, the small engine could not have supplied the city without working, at times, not only 24 hours in the day, but at a higher speed than is now considered judicious.

AVERAGE DAILY CONSUMPTION.

1858,	2,991,412 gallons.	7½ galls. to a cubic foot.
1859,	3,877,910 "	
1860,	4,703,525 "	
1861,	4,841,520 "	

ENGINE HOUSE AND GROUNDS.

No expensive or important improvements or repairs have been made to these, except in connection with the new main, which will be described under its appropriate head. The cracks in the north wall of the engine house look more and more serious, and should receive attention the coming season.

INLET.

This is not in very good order, and in consequence it has been very difficult to make the screens effective in keeping out fish or chips, that have been quite annoying in their action upon the pump-valves. The inlet will need a thorough overhauling next season, and it may then be found advisable to construct a new one.

BASIN IN THE LAKE.

This is gradually filling up with sand; and the breakwater around it shows more and more signs of decay.

Much annoyance has been experienced during severe storms, by the washing of hops and other refuse from the brewery south of the pumping works into the Basin. It is exceedingly desirable that whatever rights the owners of the brewery in question may have to deposit or retain offensive substances in such close proximity to the pumping works, should in some way be extinguished.

MAIN AND DISTRIBUTING PIPES.

The *new main*, for the laying of which arrangements were made last year, has been satisfactorily completed. It consists of a 24 inch pipe, starting from the south side of the base of the air chamber of the large engine, thence by a wrought iron curved pipe westward about 12 feet to a stop-cock, thence by a cast iron pipe under the south main entrance from the Pine street front of the engine room, directly west to near the east line of Pine street, where a 24 inch branch connects the new main with the old one. On this connecting branch is a 24 inch stop-cock. From this branch, the new main curves southward, and runs along Pine street a little west of the center of the street, to the south side of North Water street, where there is another 24 inch stop-cock. At this point the pipe is about 9 feet below the surface, and here begins a wrought iron 24 inch pipe, which continues to the south side of the river, and passes sufficiently far below its bottom to allow of its being covered with clay enough to protect it from anchors. The maker of this was Mr. C. Reissig, and it was put in its place by Mr. Martin Green, under the direction of Mr. Walker. It was feared at first that it might have been injured in the sinking, but a subsequent examination by means of man holes at each end, showed that if it leaked at all, it was too little to be of any importance. On the south side of Pine street there is an 8 inch blow-off, and just beyond the blow-off another 24 inch stop-cock. Between the dock walk on the south side of the River and the stop-cock, the pipe turns nearly a right angle to the westward. Here the cast iron pipe begins again, and continues along River street to Wabash avenue, thence along Wabash avenue to Adams street. Here a 16 inch branch is placed, and the end of the 24 inch pipe—which may be extended southward hereafter—is capped. From the branch a 16 inch pipe is laid along Adams street to State street, where it is connected by a 12 inch branch with the old State street 12 inch main, the branch having a 12 inch stop-cock to break the connection when desired. From this branch, the 16 inch pipe continues along Adams street to the alley on the east side of the Reservoir lot. Here it comes into the lot, and runs along the west side of the old main to the Reservoir, where it re-crosses the old main, passing through the the same archway to the center of the foundation of the Reservoir, and thence vertically into the bottom of the tank, through a flue that was left for the purpose of emptying the Reservoir. A 16 inch stop-cock was put on this pipe inside of the Reservoir.

The completion of the new main was delayed more than two months, first by the failure of the contractors for the pipes with regard to time, and secondly by the breaking or bending of the screws of all the new stop-cocks. Two pipes proved defective after they were laid, but not a single leak has yet occurred in consequence of defective workmanship in making joints. The laying of this pipe was under the immediate charge of Mr. John Costello, who has also had charge of the laying of all the pipes put down, together with all the repairs made of them for several years past.

DISTRIBUTING PIPES

Have been laid down in the year as follows, viz:—

SOUTH DIVISION.

STREETS.	BETWEEN WHAT STREETS.	Diameter of Pipe.	No of feet,
Michigan Avenue,	Ringold Place and Palo Alto street.	6 inch.	642
Dearborn Street,	New and Cross streets,	4 "	888
Arnold "	North and Cross streets,	4 "	1270
Prairie Avenue,	North and Old streets,	4 "	817
North Street,	Arnold and Clark streets,	4 "	230
	For Hydrants,	4 "	180
	Total,		3,977

NORTH DIVISION.

STREETS.		BETWEEN WHAT STREETS.	Diameter of Pipe.	No. of feet.
Franklin	Street,	North avenue and Schiller street,	4 inch.	1250
Wisconsin	"	Wells street and 500 feet northward,	4 "	838
Huron	"	Market and Wells streets,	4 "	495
White	"	Market and Franklin streets,	4 "	408
High	"	Wells and La Salle streets,	4 "	425
La Salle,	"	High street and 75 feet southward,	4 "	71
Ontario,.	"	St. Clair street and 355 ft. eastward,	6 "	351
		For Hydrants,	4 "	120
		Total,		3,958

WEST DIVISION.

STREETS.		BETWEEN WHAT STREETS.	Diameter of Pipe,	No. of feet,
Jefferson	Street,	Forqua and Judd streets,	6 inch.	1410
Polk	"	Blue Island Av. and Morgan street,	6 "	538
Prairie	"	Green and Peoria streets,	4 "	319
Paulina	"	Warren street and 227 ft. northward,	4 "	224
Halsted	"	Mitchell and Catharine streets,	6 "	643
Catharine	"	Halsted and Union streets,	4 "	506
Peck	"	Lake and Fulton streets,	4 "	427
Fulton	"	Peck and Sheldon streets,	4 "	500
Halsted	"	Polk street and 531 feet northward,	4 "	527
Wilson	"	Canal street and Stewart avenue,	4 "	572
		For Hydrants,	4 "	160
		Total,		5,826

The total length of main pipe laid the past year is as follows, viz:

24	inch	cast iron pipe, between the engine house and the south side of N. Water street,..............................	2,597 ft.
24	"	wrought iron pipe at engine house,......................	12 "
24	"	" " " between south side of N. Water St. and River pipe,..	104 "
24	"	wrought iron River pipe,...............	426 "
24	"	cast iron pipe between south side of River and south side of Adams street,......	3,484 "
16	"	cast iron pipe on Adams street between State street and South Reservoir,..................................	1,610 "
			8,233 ft

The total length of pipe of different sizes *in the city*, as nearly as can be ascertained, is as follows, viz:

24 inch	cast iron main pipe, ...	12,265 ft.
16 “	“ “ “ “	10,610 “
12 “	“ “ “ “	9,830 “
30 “	wrought iron river pipe, State street,...............	280 “
24 “	“ “ “ “ Chicago avenue,..........	236 “
24 “	“ “ “ “ Rush street,...............	530 “
12 “	“ “ “ “ Adams street,........... .	176 “
12 “	cast iron distributing pipe,.........	364 “
10 “	“ “ “ “	7,862 “
8 “	“ “ “ “	33,581 “
6 “	“ “ “ “	158,521 “
4 “	“ “ “ “	238,486 “
3 “	“ “ “ “	30,388 “
		503,129 ft.

or **ninety-five miles and 1,522 feet.**

HYDRANTS.

During the year the following new hydrants have been put in, viz:

SOUTH DIVISION.

1 Hamilton, S. W. cor. Michigan avenue and Ringold street.
1 “ W. side Sherman street between Polk and Taylor streets.
1 “ N. W. cor Griswold and Taylor streets.
1 “ N. W. cor. Rio Grande street and Douglas avenue.
1 “ S. W. cor. New and Dearborn streets.
1 “ S. W. cor. Old and Arnold streets.
1 “ S. W. cor. North and Arnold streets.
1 “ S. W. corner North street and Prairie avenue.
1 Cregier, Skating Pond W. side Michigan avenue.

NORTH DIVISION.

1 Hamilton, Franklin between Schiller street and North avenue.
1 New York, N. W. cor. Water and Dearborn streets.
1 Hamilton, N. E. cor. Wells and Menomonee streets.
1 “ N. side White street between Green Bay road and Lake.
1 “ S. W. cor. High and La Salle streets.
1 “ E. end Ontario street, (Skating Pond.)

WEST DIVISION.

1	Hamilton,	W. side Loomis between Van Buren and Tyler streets.
1	"	N. E. cor. Walnut and Wood streets.
1	"	S. W. cor. Jefferson and Dekoven streets.
1	"	N. E. cor. Morgan and Polk streets.
1	"	S. W. cor. Wright and Halsted streets.
1	"	N. W. cor. Union and Catharine streets.
1	"	N. W. cor. Sheldon and Fulton streets.
1	"	N. W. cor. Wilson street and Stuart avenue.

In all 23, making, together with those previously put in, a total of 469 in the whole city.

The number of Hydrants taken out to be repaired was 55, or about one in 8½ of the whole number in the city. Considering how seldom these are used for fires, the number repaired appears large. The carelessness or unskillfulness of the street sprinklers is probably the greatest cause of the hydrants getting out of order. The next is probably that of the firemen, some of whom in the hurry and excitement of their calling, are unmindful of the care with which they should be used. The repairs mentioned are not those that require merely the putting in order of slight derangements, a frequent necessity, but those that require the hydrant to be taken out of its socket, an operation which causes considerable labor, and makes it necessary to shut off the entire district in which the hydrant is located.

The Cregier hydrant, devised for the purpose of avoiding this necessity of shutting off the whole district, mentioned in the last Annual Report of the Water Commissioners, has been completed and promises to work well. I would recommend the trial of several of them in those localities where repairs have hitherto been most frequently needed.

Much pains is taken to keep the hydrants from freezing, by packing around them with manure in the beginning of winter, and by frequent examinations during very cold weather. Most of those found frozen are in boxes that are not drained, and consequently partly filled with water. Where sewers have been laid near hydrants, it is most desirable that the boxes around the latter should be connected with the former, as in excessively cold weather it is impossible with a reasonable force to keep all the hydrants constantly free.

STOP-COCKS.

The following stop-cocks have been put in during the year, viz :

SOUTH DIVISION.

1 Hamilton, 8 inch Blow-off near Rush street Bridge.
1 New York, 12 inch State and Adams streets.
1 " 16 " South Reservoir.
1 " 24 " Near Rush street Bridge.

NORTH DIVISION.

1 New York, 24 inch in Engine House.
1 " " " outside of Engine House.
1 " " " Water and Pine streets.

WEST DIVISION.

1 Walker, 6 inch Desplaines and Adams streets.

Eight in all, and, together with those previously put in, making a total of 221 in the whole city.

Nine stop-cocks have been repaired, and quite a number of others need it, but it would not be advisable to attempt it before spring. In several parts of the city more stop-cocks should be put in, where the districts it is necessary to shut off in case of repair, have become too large; besides, by increasing the number of districts, not only is the labor of shutting off diminished, but also the risk of having to shut off two or more districts, in consequence of stop-cocks being out of order.

In view of the number of old stop-cocks to be repaired, and new ones required, as well as other kinds of work frequently needed, it has been thought best to establish a small work shop at the pumping works. This is now nearly ready for use, and there is every reason to believe that it will cause a material saving in the first cost of stop-cocks, and perhaps of hydrants. But in case it should not, the certainty of getting our work well done, and *at the time* it is needed, will be of great value.

A shop of this kind has been found very serviceable on the Boston Water Works during the last ten years, and has been recommended twice heretofore for our own works by the late Superintendent, Mr. Walker, in his annual reports.

RESERVOIRS.

The north and west Reservoirs are and have been in good order during the past year. The south reservoir leaked so badly in the summer, that it was found necessary to repair it thoroughly before filling it through the new main. This was supposed to be done about the 10th of October, when the reservoir was filled, and new leaks were discovered. It was used for sometime, however, but when dampness showed itself through the outside walls, it was determined to make further repairs. These have been completed and the water again let on. A very great improvement has been made, still a few leaks exist which it will not probably be necessary to repair before spring. The difficulty with this reservoir is owing to the quality of the English iron used, which, it is now very clearly seen, was unsuitable for the purpose. It may be necessary to put in an entirely new bottom before making it tight, but it is still hoped that this expense may be avoided for a few years.

The ground around the south reservoir has been enclosed by a substantial picket fence, which has not only greatly improved its appearance, but has added much to its value as a place for keeping water and sewerage pipes. A commencement has been made towards grading it up with street dirt. When this is completed, a good part of it may be sown down in grass and otherwise ornamented at a small expense.

Previous to the completion of the new main, the south reservoir was of very little use, as it was found impossible to get more than a few feet of water in it, and that generally in the night, while during the day it stood most of the time below the bottom of the reservoir. Since the completion of the new main, no difficulty is found in filling this reservoir to overflowing in the day time, especially when the large engine is at work.

QUALITY OF THE WATER.

With the exception of turbidness during and shortly after easterly storms, the quality of the water furnished has generally been very good; but there have been occasional exceptions, the most important of which are owing to three different causes.

First, after a long continuance of snow and ice, a thaw and rain are sure to be followed by an unpleasant smoky taste in the water, lasting from one to two days. This happens seldom more than twice in a winter, and sometimes not more than once.

Second, the "*fish nuisance*," as it has been generally called. This has never been so annoying before as it has been this winter. In December they came in such quantities as to choke up the only screen that was effectual in keeping them out of the pumping well, and in order to prevent the pumps from sucking air instead of water, it was found necessary to remove this screen, which being in the grooves intended for a stop gate, could not be cleaned without being taken out, and the very act of taking it out necessarily let all the fish accumulated above it pass through. It was hoped and believed, judging from the experience of previous winters, that the trouble would cease in a shorter time than any thing effectual could be done in at the entrance of the inlet pipe. At this point three screens had been put in, with conveniences for taking one out at a time to be cleaned, while the others stopped the passage of fish or other substances. But the bottoms of these screens had been undermined, and the protection to the inlet supposed to be otherwise so much injured by the ice, as to render any attempt at effectual repairs hopeless. But as the nuisance continued, and caused the hot water from boilers connected with the works to be peculiarly offensive, and sometimes causing even the cold water to taste, to say nothing of the offensive sight of so many dead and mangled fish coming from the taps in nearly every part of the city, an attempt was made to close up the openings under the screens by means of stones, gravel and canvas; first building a shanty over the screens to shelter the laborers. Men were then set to watch the screens at the inlet night and day, and the screen that had been taken up near the engine house was put in its place again. This appeared at the time to be effectual, as the screen near the engine house did not become foul. In about three days after the work was done, the fish ceased to trouble us at the inlet. The pipes all over the city were flushed out by means of the fire hydrants, and the reservoirs thoroughly cleansed. The cold water immediately became free from offensiveness to sight, smell or taste, and the boilers gradually lost their disagreeable odor. After we had begun to congratulate ourselves upon the purity of the water, and that the fish would not trouble us again this season, they re-appeared suddenly, through previously undiscovered openings, in great multitudes, and made it necessary to take out the screen near the engine house. This was very early on the morning of the 7th inst. After being cleansed the screen was put back, but becoming foul again in the afternoon, it was broken in the attempt to take it out. By keeping men day and night at the inlet a great many fish were caught, and a repetition of the nuisance on anything like the former scale was prevented. After three or four days the fish ceased to appear in great numbers, and we trust no serious inconvenience will arise from them again this winter, and before another it is intended to erect such a structure as will prevent the possibility of a recurrence of the evil.

Third, the most serious cause of impurity is believed to be the river. There have been several occasions during the last three years when many persons thought they could perceive the effect of the river in the taste of the water, but not until the night of the 10th inst., and during several days since, did that effect become so striking as to convince all who have examined into it of its real nature. On the morning of the 10th, the wind being from the south and westward, the Lake fell to an unusually low point. This, of course, caused a very large amount of water to be discharged from the river into the Lake, producing the well known disagreeable effect upon its taste and smell, so that it could be distinctly perceived along the shore, from a considerable distance south of the river, to the cemetry on the north. Since the 10th the water has twice been free from this taste and smell, and twice has it become offensive. The taste thus given to the water supplied to the city is much more offensive than that caused by the fish, while it is utterly impossible by any means at the disposal of the Board to prevent it at present.

Two questions immediately arise; what means have the Board of preventing it in the early future, and how can the earliest possible relief be obtained? Before discussing these questions it may be better to dwell upon the causes of the present, and former offensive states of the river.

The discharge of the sewers into the river, will at once be pointed at as the great cause, and the late Board of Sewerage Commissioners in the plan which they adopted, with the concurrence of the City Council, took the ground that the time would come when the discharge of all the sewerage of the city into the river would make it offensive, and provided a plan for correcting the evil; that of a constant infusion of fresh lake water into the river by means of steam power.

But while the sewers have undoubtedly had their share—and a very important one too—in corrupting the river, another cause, which did not in 1855, if it does now, legally exist, has tended most powerfully to produce the present state of things; and that is the wholesale discharge of blood, and other refuse from the slaughter and packing houses, in and around the city, besides distilleries, glue factories, establishments for rendering offal, &c.

It may seem to some idle to attempt to separate the effect of the packing houses, &c., from that of the sewers, but the following well known facts will make it clear that the effect of the former can be distinctly traced. Last spring the river became quite offensive in smell, and a committee was appointed by the City Council to confer with the officers of the canal in relation to changing the water in the river by pumping at Bridgeport. It so happened that before any arrangement was made it became necessary to pump to supply the wants of the canal itself, and nothing more was done by the city. During the whole summer and the early part of autumn, the river, though receiving its full amount of sewerage, did not become so offensive at any time as to be a cause of complaint. Very soon, however, after the packing season commenced, a most disagreeable odor was observed near the Old Street Bridge, on the South Branch, which is *above* the outlet of any existing sewer. This peculiar odor could be traced afterwards, as it moved down stream, till it reached the mouth of the river.

As an additional proof that the sewers do not cause all the bad smells, it may be here mentioned that in 1860 the discharge from piggeries and cow stables high up on the North Branch, made that stream exceedingly offensive to its mouth. It is also very offensive this winter, and yet there is not a single sewer emptying into it at ordinary times, and only two, those on West Kinzie and Fulton streets, that do in times of heavy rains.

Many of the older inhabitants of Chicago no doubt remember that before any sewers were built, and when the packing business was in its infancy compared with its present state, the river became so offensive from the discharge of blood and other refuse into it, as to lead to the passage of a city ordinance forbidding it.

Another reason can be given for the excessively offensive state of the river this winter, as compared with what it was last summer. It is well known that water will become purified from offensive organic matter by simply letting it stand in contact with the air a sufficiently long time; hence the more rapidly it can be brought into contact with the air, the more rapidly it becomes purified. Now during the summer the surface of the river was not only uncovered, but frequently agitated by the passage of tugs and other vessels, which tended powerfully to purify it. But during much of the winter the surface of the river has been covered with ice, and consequently the air has been almost entirely excluded from it. It has been like a bottle with two mouths, which, originally filled with comparatively pure water, but receiving only continual accessions of filth into one mouth, soon ceases to discharge anything but filth from the other.

The late Board of Water Commissioners directed their attention to the complaints of injury to the water pumped up for the city "from the wash of the lake shore and the flow of the river," and caused surveys and estimates to be made and plans to be discussed. By reference to their report of Jan. 1st, 1861, p. 28 to 44, it will be seen that five plans were estimated for. These are:

1st, Extending a pipe a mile out into the lake.
2d, Making a tunnel the same distance.
3d, Removing the pumping works to Winetka.
4th, Constructing filter-beds.
5th, Constructing a subsiding reservoir.

None of these plans were recommended for immediate adoption, but it was thought best to wait another season, and test by chemical analyses whether the effect of the river as far up as the pumping works was really appreciable or only imaginary. These analyses have been made with great care and labor by Drs. Blaney & Mariner, and their report is before you.

Neither of the plans above mentioned could be made available for present relief, and it is yet uncertain which, upon the whole, it would be best to adopt. That of removing the pumping works to Winetka (or perhaps to a point a few miles nearer—say nine or ten miles north of the city)—would undoubtedly give entire freedom from the effects of the river and the wash of the city shore, but its cost would be so great as to make it advisable, if not absolutely necessary, in the present state of the city's finances, to inquire if such an outlay cannot be avoided.

The late Board of Sewerage Commissioners not only embraced in their original plan a method of preventing the river from becoming offensive from sewerage, which the result of pumping at Bridgeport proves would be effectual, but kept the subject continually in mind, as their late published reports will show. In that for the half year ending June 30, 1860, p. 16 and 17, will be found what was then believed to be the best plan to keep the river free from offensiveness; and that was to make an arrangement with the Canal Board to keep their pumps in operation so much of the time during six months of the year as might be necessary to preserve the river from smelling bad, though the wants of the canal might not require it. The experience of the present winter shows that such an arrangement should be extended so as to embrace occasional pumping in winter, if practicable then, as well as in summer.

The above plan, as will be seen by referring to the report mentioned, was not recommended as a permanent one, but simply as the most advisable expedient for a few years to come, giving time to settle several important questions relative to the future of Chicago, before adopting a more permanent, thorough and necessarily costly plan. The questions alluded to are the probable growth of Chicago, the direction of that growth, the harbor improvements that may be adopted, the construction of the proposed ship canal to the Illinois River, and the necessity or expediency of imitating the great sewerage intercepting scheme of London, now being carried out. The light which a few years will throw on these questions would be of immense advantage to Chicago, in the planning of permanent works to remove the evils now complained of.

The analyses of Drs. Blaney & Mariner are not quite so extensive as was thought desirable last year, but this has been owing to the war, which first took away Dr. Mariner as a three months' volunteer, and afterwards occupied all the time of Dr. Blaney as Surgeon and Medical Purveyor. Still their analyses, as far as they have gone, are very thorough, and, while confirming some theories held before, have corrected others.

The theories confirmed are not only the one that the water of the lake is the purer the further you take it from the shore, but the one that impurities are greater, within the city limits, south of the river, than at a much less distance north. Perhaps a larger number of analyses might modify the latter statement somewhat. The fact that on the 17th of April last, water taken from the river at Clark street bridge was purer than that taken from the lake, opposite Cleaverville and one thousand feet from the shore, is certainly very striking, and shows how great an effect the rains of spring have on the river. In November and now, not only analyses but our senses show a very different

One theory corrected is that there is less organic matter in our lake water, say not more than a mile from the shore, than there is in that furnished to New York, Philadelphia and Baltimore; there is in reality more. It is also greater than that supplied by the London Water Companies in 1856. Another theory a non-professional person is apt to hold is that the offensive water taken from "dead ends" in the city pipes contains a greater amount of impurities than that which is not offensive and taken from pipes having a free circulation; but analysis shows less organic matter, the offensiveness being due, not to its quantity, but to the change it is undergoing. The actual diminution of organic matter is supposed to be owing to the action of the iron pipes.

Another striking peculiarity of the lake water is the large amount of silica it contains, and to this is owing its peculiar effect upon boilers, besides that which the lime it contains is known to exert. The river water also contains very large proportions of it at times.

But the analyses and report are worthy of careful study, without which they can neither be appreciated nor understood. Such a study indicates that further examinations should be made.

Appended to the analyses will be found a statement of the places from which each specimen of water was taken, together with the date when it was taken. This statement was purposely withheld from the chemists, that they might not be influenced in their course of investigations by previously formed theories; hence the absence of any attempt to explain apparent anomalies.

Much of the impurity complained of and shown by the analysis to exist near the shore, might be avoided by laying a pipe about 1000 feet out into the lake, to the edge of navigable water. This was suggested, p. 41 and 42, of the last annual report of the Water Commissioners, and a rough estimate of its probable cost ($30,000) was given.

The first freshet will no doubt purify the river, and restore it to the state it was in last April. This will be a natural relief, and may be expected soon.

In concluding this article on the quality of the water, what has been said may be thus summed up:

1st, The smoky taste occurs so seldom as not to be a serious matter.

2d, The fish nuisance can and no doubt will be entirely prevented before next winter.

3d, The very disagreeable taste and smell occurring at three different times during the last two weeks, and lasting two to three days each time, evidently proceeded from the river.

4th, The offensive state of the river this winter, is due very largely to the great quantity of blood and other refuse discharged into it from packing houses, distilleries, &c.

5th, Pumping at Bridgeport would bring the speediest, and would be the most economical temporary relief.

6th, It is exceedingly desirable to postpone the adoption of very expensive permanent plans a few years till more light can be obtained on the several questions before mentioned.

7th, The analysis shows, what was known to chemists before, that an offensive taste and smell in water, is owing not so much to the quantity of organic matter present, as it is to its condition of life or decay.

8th, Natural relief may be expected soon from the thaws and rains of spring, which must change the character of the water in the river.

METERS.

There are now in use in the whole city 10 Meters. They are all of the Worthington Patent, and of the following sizes, viz:

2—⅝ inch.
5—1 inch.
2—2 inch.
1—3 inch.

Wherever it has been thought best to introduce them, and they have been kept in order a sufficiently long time, they have more than paid for themselves by the increased rates they showed should be charged. In a few instances they have been prevented from working by grit and sand in the water. A contrivance for preventing this is now under trial, and if it should succeed, as we hope it will, we can attach meters again to some of the largest hotels where they failed before, and where it is very desirable to have them.

A surprising case showing the importance of water meters, is mentioned, page 10, of the Annual Report of the Cochituate Water Board, (of Boston), just published. It was found by trial that five water closets at a railroad station, for which $25 a year had been paid, used water enough to amount to $1,802 a year.

SEWERAGE.

The amount of work done in this department during the year 1861, was very much less than was done any previous year. Extensive preparations were made in May last for putting under contract a number of sewers in sections of the city where they were very much needed; but in consequence of the currency troubles which then came on, the further prosecution of the work was stayed.

Three fourths of the small amount of sewers actually built was owing to advances for their construction by interested parties. The following is a description of them:

LOCALITY.	CONSTRUCTION.						REPAIRS.		
	Date	5 foot Sewer built	3 foot Sewer built	2 foot Sewer built	1 foot Sewer built	Catch Basins built	Lin. ft. Sewers repaired	No. of Catch basins repair'd	No. of Man Holes altered
SOUTH DISTRICT.									
Harrison Street, East from River	May		50ft						
Clark Street, at corner of North	April				10ft				
Lake Street, State to Franklin	Oct. & Nov.				1531ft				
Catch Basins in South District						13			
Totals in South Eistrict			50ft		1541ft	13	70ft	60	90
WEST DISTRICT.									
Adams Street, between River and Canal	April	50ft							
Beach Street, between Polk and Ewing	May			286ft					
Stuart Avenue, between North and Meager	July			445ft					
Monroe Street, between River and Canal	April			15ft					
Aberdeen, between Madison and Monroe	June				269ft				
Catch Basins, Beach, Randolph, Stuart Av						5			
Total in West District		50ft		746ft	269ft	5	10ft	134	49
NORTH DISTRICT.									
Cass Street, from Chicago Av., South	June				70ft				
Pine Street, from Pearsons Street, North	August				100ft				
Totals in North Districts					170ft		10ft	221	
Totals of Three Districts		50ft	50ft	746ft	1980ft		90ft	415	139

Mr. Wm. H. Clarke, Asst. Engineer of the Board, who, in addition to his other duties connected with the sewers, has had special charge of private drains for the last two years, reports the following in relation to them:

“RETURN OF PRIVATE DRAINS LAID DURING THE YEAR 1861.

	12 INCH.	9 INCH.	6 INCH
SOUTH DISTRICT.			
Twelve inch Drains	3		
Nine inch Drains		10	
Six inch Drains			132
NORTH DISTRICT.			
Twelve inch Drains	2		
Nine inch Drains		2	
Six inch Drains			49
WEST DISTRICT.			
Twelve inch Drains	2		
Nine inch Drains		2	
Six inch Drains			41
	7	14	222

There have also been during the year twenty-one drains extended and altered in the different districts, which have come to the knowldge of the department; some work of that kind probably having been done without due notice according to the regulations. The drain layers now licensed by the Board, who remain in the city, are generally trustworthy mechanics, and are disposed to do good work.

There have been less stoppages of drains during the past year than formerly, and such as occurred were due either to the introduction of improper substances into the soil pipes, or to the neglect of the catch basins. In the drainage of hotels and eating houses, the introduction of grease into the drains is still a frequent cause of stoppage.”

LENGTH IN FEET OF SEWERS LAID TO DECEMBER 31st, 1861.

	SOUTH DISTRICT.		NORTH DISTRICT.		WEST DISTRICT.		
Diame'r in feet	Previous to 1861	1861	Previous to 1861	1861	Previous to 1861	1861	Total feet
6			3,895		1,292		5,187
5	361		4,761		17,040	50	22,221
4½					2,010		2,010
4	1,952		5,498		5,208		12,658
3	13,555	50	3,828				17,433
2½	19,478						19,478
2¼	6,359						6,359
2	20,258		34,409		30,429	746	85,842
1	64,684	1,541	25,057	170	23,503	269	115,224
	126,647	1,591	77,448	170	79,491	1,065	286,412

Or very nearly 54¼ miles; besides 1,192 catch basins with connecting pipes for receiving water from the streets, and 2,135 man holes for entering the sewers.

Two thousand four hundred and thirty-seven house and private drains have been laid and connected with the sewers. These have been laid by, or at the expense of the owners of the property drained. A much larger number might and ought to have been laid by this time, but for the last four years, property holders have generally been very averse to making avoidable expenditures.

Very little can now be added to the statements and suggestions relative to the future management of this department, made in the report of the Sewerage Commissioners for the half year ending Dec. 31st, 1860.

The condition of the river is described under the head of Water Works, where will also be found suggestions as to the causes of its present state and the remedy therefor. Soundings of the river have been taken this winter, and its general depth found to be as great as it was in 1855, before the sewers were commenced. The alteration in bridges and dock lines since then have caused material changes of depth in some places. The large amount of snow on the ground, in the country around Chicago, if it should go off suddenly by a rain or thaw, will no doubt scour the river very thoroughly, as well as entirely remove its offensive character for the time being.

The cleansing of the sewers has been less troublesome and expensive the past year, than it was the year previous, as will be seen by the following:

COST OF CLEANSING SEWERS AND CATCH BASINS.

YEAR.	SEWERS.		CATCH BASINS.		TOTAL.	
	Dolls.	Cts.	Dolls.	Cts.	Dolls.	Cts.
......1859........	1,492	59...	479	00...	1,971	59...
......1860........	5,087	08...	532	40...	5,619	48...
......1861........	4,199	85...	1,274	18...	5,474	03...

The cause of the reduction of the cost of cleansing the sewers is partly owing to the more perfect removal of obstructions left in the sewers by unfaithful workmen, but still more to the efficiency of the new and large tank called "Garibaldi," which was constructed and is now used under the immediate direction of Mr. D. Knights, the Inspector of Sewers. By means of this tank, a small party of men and four horses, the smaller sized brick sewers can be cleansed in less than one-third the time, and one-half the cost required before. The pipe sewers were flushed before with a smaller tank, but the large one is much more efficient for them. Heavy deposits must still be taken from the larger sized brick sewers by manual labor, but these can easily be entered by men with wheelbarrows.

Which is respectfully submitted,

E. S. CHESBROUGH,

Chief Engineer.

SECRETARY'S REPORT.

Office of the Board of Public Works,
CHICAGO, ILL., FEBRUARY 24, 1862.

To the Board of Public Works of the City of Chicago:

GENTLEMEN:—I submit herewith the accompanying statements, showing the expenditures of the Board during 1861, and the financial condition January 1st, 1862, of all the departments under your charge. The statements have been made as much in detail as was practicable, without making them altogether too long.

Without attempting a full report of the doings of the office during the year, I avail myself of this opportunity to invite your attention to certain matters which seem to me to require your action.

The manner of enforcement of the collection of the water tax on buildings within the water district, but not supplied directly from the pipes, is by the present law burdensome and expensive, both to the city and the parties paying the tax. We now enforce the payment of the tax by the sale of the building or other personal property, which can never be effected for anything like their value, while the sale is without the relief of a possible future redemption. I would recommend that the tax be made less than it now is, and that it be made a lien upon the lot, and that if not sooner paid in, judgment be had against the lot at the same time as for other city taxes, preliminary to the sale of the lot at the annual tax sale.

There are now held warrants for some of such taxes extending back to the year ending May 1st, 1857, notwithstanding a great deal of labor has been expended during the past year in the effort to close them up. For the several years given below, the warrants amount as follows:

For the year May 1st, 1858 to May 1st, 1859, . .	$1,701 40
" " " " " 1859 " " 1860, . .	4,371 82
" " " " " 1860 " " 1861, . .	8,957 39
	$15,030 61

I have to recommend one other change in our water law, which, as well as that which I have already suggested, can be done only by enactment of the State Legislature. Probably no large city covers so much ground in proportion to its population as does Chicago. All our improvements are hence correspondingly large in proportion to the occupied property, and as the water tax is assessed only on such lots fronting where the pipes are laid as have buildings on them, it follows that a large share of the pipe laid is fronted by lots paying nothing, leaving the whole tax for interest and expenses to be borne by the occupied lots. Some idea of the difference between our own and other cities as to the relatively large extent of ground occupied by the population of our own city can be gained by a comparison of the amount of water tax received annually in several cities from each mile of pipe laid.

Name of Cities.	Miles of pipe all sizes.	Annual Water Receipts.	Receipts per mile of pipe.
Chicago, ...	95.288	$131,035 10 (1861)	$1,375 15
Cincinnati, ...	86.380	203,591 24 "	2,356 93
Boston, ...	131.295	342,138 75 "	2,605 87
New York, ...	280.270	765,954 35 "	2,732 91

Were the occupied property alone made to bear the burden of the street improvements, the sidewalks, the lighting of the streets, the sewers, &c., as is done now in regard to the water, the injustice of such unequal taxation would be felt sorely enough to be speedily remedied. The vacant lot is benefited by the introduction of the water as it is by the sidewalk or street improvement in front of it, by the gas-lighting, or by the sewer. Yet we tax the lot for its share of the benefits derived from all the latter named expenditures by the city, and do not tax it for the expense attending the conveying of the water to it.

Of the lots fronting the about 90 miles of distribution pipe laid in the city, 33 miles are vacant, and pay no water tax. From 33 miles of property fronting on the pipe, not one cent in return has yet been received, and the interest on the original outlay, and the expense of maintaining the same, and the hydrants, &c., are borne by that share of the pipe running in front of occupied lots.

The distribution pipe laid costs about one dollar per running foot. My own judgment and recommendation is that all the lots so fronting where pipes are or shall be hereafter laid, be taxed a sufficient amount to provide for the interest on the cost of the pipe as laid, or say from seven to ten cents per front foot of lots; and that for this purpose the necessary legislative authority be obtained as soon as possible.

The following extracts show the course pursued in several cities in dealing with the two kinds of property to which I have called your attention.

The New York law is similar to ours in taxing all buildings in the water district, but differs in that the tax is made a lien upon the lots as well as buildings.

Extract from Sec. 18, Act of April 11th, 1849, New York State Laws:

> "Such regular rents, when so established, shall be collected from the owners or occupants of all such buildings respectively, which shall be situated upon lots adjoining any street or avenue in said city, in which the distributing water pipes are or may be laid, and from which they can be supplied with water. Said 'regular rents' shall become a charge and lien upon such houses and lots respectively, as herein provided."

In Philadelphia when pipe is laid in any locality, the property fronting on the street where the pipe is laid, is taxed seventy-five cents per foot of lot, or one dollar and fifty cents per running foot of pipe, which is more than the cost of the pipe as laid here. Besides this, against every dwelling house on the line of the pipe, an annual water tax is assessed, unless the owners can show that the property obtains water from other sources than the City Water Department. I give herewith the law taxing for the first cost of the pipe:

Extract from an ordinance January 29th, 1855.

SEC. 1. That whenever any pipes for the conveyance of water shall be laid in any of the streets or highways within the city of Philadelphia, the owners of the ground in front whereof the same shall be laid, shall pay for the expenses thereof the sum of seventy-five cents for each foot of the front of the ground upon such street. *Provided,* that on all corner lots an allowance shall be made of one-third the length of one of their fronts, but such allowance shall be made on the street or highway having the longest front, and in case both fronts are of equal dimensions the allowance shall be made on the street in which the pipe shall be last laid; but in no case shall the allowance exceed fifty feet on any corner lot: *and provided always,,* that where a corner lot shall have erected upon it two or more seperate tenements there shall only be an allowance made equal to one third of the depth of the corner tenement and the yard adjoining."

In Cincinnati in addition to the water rent, a tax of ten cents per front foot of each lot on all streets where the pipe is laid, was collected last year. It is now under discussion to have the annual interest on the water debt and a certain amount for a sinking fund provided for by general city taxation, and to omit the front foot tax, there being a collection as usual from all parties using the water.

During the year rules were submitted to you for the organization of that part of the office having to do with the assessing and collecting of the water tax, the accounts and the receipts of money by the Board. These rules were approved by you and were intended to systematize the business of the office, and to throw as many guards as possible around the handling and accounting for money receipts. They work well, and I see now no reason for recommending any change in them.

As you are aware, it is a matter of much difficulty to test the actual water receipts with the amount of water rates assessed. A very considerable portion of the collections is from consumers whose rates are changeable—depending upon their amount of business and kind of business—and in actual practice from one cause and another, as many as twenty changes, some increasing and some lessening the amount to be collected on the books, will be made in one day. Such changes in the course of the year will probably number over a thousand, altering from day to day the amount of water rent recorded in the books at the opening of the year. The new water rent books have been prepared with the view of keeping account of all these changes, so that at any time a deduction of the uncollected water rents from the total to be collected, may show the actual cash collection of the office.

One other result I have for a considerable period striven to accomplish, which is, that we have plats of all the lots in the city, and on these plats a record of the buildings upon them; and that there be an annual examination of all the property of the water district. The finely executed atlas of the city prepared by Mr. W. P. Davie, for the Board, and on which he spent more than a year's labor, was the first step towards securing this result. The copying of the plats from this atlas on a larger scale, is a work of considerable time, and with the assessing is under the care of the assessor, Mr. O. F. Woodford. The whole work is in progress but can hardly be finished during the year unless the prepared plats are furnished to Mr. Woodford. I consider it essential to a complete and accurate assessment. As a considerable gain will result to the city, it is desirable that this re-assessing be brought about as soon as possible.

Very respectfully, sirs,

Your obedient servant,

A. W. TINKHAM.

Secretary.

Trial Balance, Ledger Board of Public Works, Dec. 31st, 1861.

WATER DEPARTMENT.

	Dr.	Cr.
Water Works,	$1,074,338.94	
Water Works Income,		$ 744,244 19
Water Loan Bonds, 6 per cent,		1,030,000 00
Water Loan Bonds, 7 per cent,		113,000 00
Water Loan Interest,	379,861 72	
Water expenses and repairs,	270,508 89	
Discount on 6 per ct. Water Loan Bonds,	84,900 60	
Water Fund in hands of City Treasurer,	11,136 38	
Water pipes,	13,478 03	
Water Works Stock,	8,586 81	
Water Works Coal,	4,729 99	
Atlas of the City,	840 00	
Water Works Service Cocks,	122 83	
Duncan Sherman & Co.	38,740 00	
	$1,887,244 19	$1,887,244 19

WATER FUND.

Statement of Cash Receipts and Expenditures by the Board of Public Works from the date of its organization, May 6, 1861 to Dec. 31, 1861, inclusive.

RECEIPTS.

Deposited by the Water Commissioners with City Treasurer,		$ 23,131 35
Water Tax collected,	$111,560 50	
Received for shutting off and letting on water, &c.,	78 94	
Received for tapping pipes,	1,265 50	
" " sale of materials	175 08	
" " " " boiler,	350 00	
" " thirty-eight Water Loan Bonds paid for new water pipe,	38,430 15	151,860 17
		$174,991 52

EXPENDITURES.

Water Tax paid back by audited vouchers, - - - - - -	$ 29 10	
Interest on Water Loan Bonds July 1st 1861, - - - - -	33,525 00	
Interest on same January 1st, 1862,	34,855 00	
Commission of Duncan Sherman & Co., for paying interest, - -	83 81	
Exchange paid on the above including the loss on the Water Coms'. deposit with Ch. M. & F. Ins. Co. and loss on Illinois and other currency, - - - - - -	11,473 65	
New Main and extension of distributing pipes, - - - - -	53,723 76	
Operating expenses, - - -	24,823 87	
Tapping pipes expenses paid, - -	837 63	
Water pipes purchased and not used,	1,102 09	
Coal " " " "	2,664 99	
Hydrants, " " " "	201 24	
Atlas of the city, - - -	535 00	
	$163,855 14	
Add bal. in hands of City Treasurer,	11,136 38	
		$174,991 52

WATER FUND.

A detailed statement of the cost of the various operations conducted by the Board from May 6th to December 31st, 1861, inclusive. The statement shows first, the cash payments under the several accounts, and finally, the actual cost of all constructions, the repairs and operating expenses of the Water Works.

NEW MAIN ON PINE ST., WABASH AV., AND ADAMS ST.

	CASH PAYMENT.	TRUE COST.
874 tons and 634 lbs. 24 and 16 inch pipes, - - -	$33,214 95	
Carried forward, ...		33,214 95

Brought forward,	$33,214 95		
Sleeves, caps, branches and small castings,	359 08		
Dockage of pipe and rent of testing yard,	218 16		
Balance on wrought iron pipe at crossing of Chicago River and elsewhere,	1,284 18		
Testing and laying the pipes,	1,885 07		
Trenching and back filling,	1,119 03		
Balance for dredging or laying pipe across Chicago River and through the dock,	707 50		
Rent of dock used in laying river pipe,	179 17		
493 pigs of lead,	1,665 77		
Coal, $17.60, gasket packing, $47.28, plank $20.33,	85 21		
Tools and repairing tools $114.67, carpenter work $17,	131 67		
Stop-cocks,	1,366 40		
Hauling pipes,	364 70		
Work preparing testing press for use,	52 93		
Masonry for man-holes,	94 85		
Repairing wrought iron pipe $25, repairing paving $47.09,	72 09		
Miscellaneous and petty expenses	52 30	$42,853 06	
Add, for one 24 inch stop-cock, used, previously paid for,	187 50		$43,040 56

DISTRIBUTING PIPES.

Cast iron pipes, generally 4 and 6 inches, 189 167-2000 tons,	8,005 56		
Caps, sleeves and small castings,	72 50		
Testing and laying pipes,	700 81		
Trenching and back filling,	900 83		
Carried forward,	$9,679,70	$42,853,06	$43,040,56

Brought forward,		$9,679,70	$42,853,06	$43,040,5
23 Hydrants,		718 00		
Hydrant boxes,		90 09		
79 pigs of lead,		291 45		
Tools and repairs $12.32, miscellaneous, $1.90,		14 22		
Coal, $19, gaskets $5,		24 00	10,817 46	
Add, castings paid for by old iron,	$35 69			
72 pigs of lead previously paid for,	300 00			
One 4 inch hydrant,	45 00			
	$380 69			
Deduct, recd. for work at skating pond,	22 50			
Recd. for old iron sold,	90 72			
	$113 22	267 47		11,084 9
The only item charged to cost of Water Works, not included in the "Main" or Distributing Pipes, is, Engraving Bonds,			53 24	53 2
Total addition to cost of Water Works,			$53,723 76	$54,178 7

WORKING EXPENSES.

EXPENSES AT THE PUMPING WORKS.

Salary of Engineer and 2 assistants,	1,680 00
Firemen and laborers,	1,201 71
Coal, 1625 505-2000 tons,	5,990 27
Oil 173 galls, $139.15 tallow, 563 lbs. $52.49,	191 64
Cotton Waste,	100 26
Pack'g $24.50, grate bars $68.22	92 72
Hardware, $15.47, iron work,	
	$9,256,60

Brought forward, . .	$9,256 60		
$21.22, - . - -	36 69		
Gas $132, glazing $10.25, -	142 25		
Carpenter work $12.50, lumber $13.38, - - - -	25 88		
Paints &c. $11.75, lightning conductor $9, - - -	20 75		
Miscellaneous and petty items, -	19 96		
Masonry repairs of fire room and engine house, - - -	44 08	9,546 21	9,546 21

REPAIRS AND MISCELLANEOUS OPERATING EXPENSES.

Repairing South Reservoir, iron work - - - - - -	1,521 68		
Labor cleaning, painting &c., for same, - - - - -	185 87		
Proof paint for seams for same,	31 25		
Masonry, repairing same, -	18 00		
Sewerage permit, same, - -	8 25		
Fencing S. Reservoir lot, -	121 24		
Glazing South, West, and North Reservoirs, - - -	9 00		
Labor of watching at Reservoirs,	82 00		
Wages of calkers, laborers, &c., repairing and taking care of pipes, hydrants, stop-cocks, &c.	1,255 36		
Repairs of hydrants, stop-cocks, and tools, shop work, - -	194 57		
Repairing and attaching meters,	134 57		
Hay and oats, $95.34, horse shoeing, $43.94, - -	139 28		
Wagon repairs $29.27, harness repairs $25.75, - - -	55 02		
Lumber chiefly for hydrant and stop-cock boxes, - -	44 96		
Nails and hardware $37.82, miscellaneous $51.32, - -	89 14		
Coal $6.10, lead $113.68, gaskets			
Carried forward, . . .	$3,890,19	$9,546,21	$9,546,21

Brought forward, - - -	$3,890,19	$9,546,21	$9,546,21
$2.50 - - - - -	22 28		
Repairs of screen $9.50, grading engine house lot $10, - -	19 50		
Two 3 inch hydrants - -	63 00	3,994 97	
Deduct, receipts shutting off water and miscellaneous labor,	127 80		3,867 1

OFFICE EXPENSES AND SALARIES.

Salaries Water Comrs. and Secy. May 1st to 6th, - - -	75 01		
Water Superintendent May and June, - - - - -	300 00		
Commissioners Board of Public Works, - - - - -	2,374 97		
Secretary $630, Engineer $1,200, City Superintendent $380.65, Clerks $1,796.69 - - -	4,007 34		
Water Assessor and Collectors,	2,633 88		
Half cost of new safe, - -	275 00		
Office furniture and fixtures, -	166 00		
Rent of old Water Comr's. office,	600 00		
Labor, care of office &c. - -	114 00		
Blank books, stationery, binding and printing, - - -	366 74		
Legal services, - - -	116 66		
Advertising $116.85, newspapers $7.50, - - - - -	124 35		
Coal $20.80, gas $1, horse feed, (assessor) $23.94 - -	45 74		
Seal and press $10, miscellaneous $73, - - - -	83 00	11,282 69	11,282 69
Total operating expenses,		$24,823 87	$24,696 07

INTEREST.

Interest on Water Loan Bonds, July 1, 1861 and Jan. 1, 1862	68,380 00		
Carried forward, . . .	$68,380,00		

Brought forward, - - -		$68,380 00		
Exchange paid on above, including the loss on Ch. M. & F. Ins. Co. Bank acct. with Water Commissioners, - -		8,682 01		
Commissions paid Duncan Sherman & Co., - - -		83 81		
Loss on Ill. currency taken in May, - - - - -		2,713 58	79,859 40	
Add, amt. charged from discount to interest,	$2,490.18,			
Deduct, accrued interest on 38 bonds sold,	430.15	2,060 03		81,919 43

RECAPITULATION.

Total additions to Water Works	53,723 76	54,178 73
Total operating expenses, -	24,823 87	24,696 07
Total interest, - - -	79,859 40	81,919 43
	$158,407,03	$160,794,23

SERVICE COCKS.

Service of Tapper, - - -		$328 00	
Service cocks,		394 50	
Cast iron boxes and covers,		102 88	
Iron work repairing tapper's tools, &c., - - -		12 25	837 63
Add, service cocks previously paid for,	125.42		
Cast iron boxes and covers bo't with old iron,	49.56		
	$174.98		
	1,012 61		
Cash rects. for tapping, 1,265.50			
Service cocks on hand Jan. 1, 1862, 122.83			
Carried forward, . .			$159,244,66

Brought forward, - - -			$159,244 66
Profit on Service Cock acct.		375 72	
	$1388.33	$1388.33	

WATER PIPES.

Expended in purchase of pipes not used, - - - -		1,102 09

COAL.

Expended in the purchase of coal on hand, - - - -		2,664 99
Atlas of the City, - - -		535 00

STOCK.

6 hydrants purchased and not used . . . - -	$144.90	
Hydrant bends, . . .	56 34	201 24

INCOME.

Water rents paid back,	29 10	
Uncurrent money taken, . .	78 06	107 16
Total amount of payments by the Board May 6, to Dec. 31, 1861, - - - -		$163,855 14

WATER FUND.

Detailed statement of the expenditures by the Board of Wate Commissioners from January 1st, 1861, to May 5th, 1861, inclusive

NEW MAIN ON PINE ST., WABASH AV., AND ADAMS ST.

	CASH PAYMENTS.	ACTUAL COS
24 inch wrought iron pipe crossing Chicago River, - - -	$3,500 00	
Dredging, &c., laying river pipe,	2,200 00	
Use of dock for laying river pipe, - - - - - -	80 00	
Surveying $13.94, advertising $12.00, miscellaneous $1.50,	27 44	
Repairs of testing press $81.20		
Carried forward, ...	$5,807,44	

Brought forward, . . .	$5,807 44		
freight stop-cocks $4,14, -	85 34		
Expenses selling bonds, - -	27 15	$5,919 93	
Add, Commissions selling 19 Water loan bonds, - -	72 04		$5,991 97

DISTRIBUTING PIPE.

Laying pipes, - - - - -	$32 00		
Trenching and back filling, -	82 93		
Making hydrant and stop-cock boxes, - - - - -	37 00		
Rent of pipe yard $100, repairs tools, $4 75, - - -	104 75	256 68	
Add, pipe used previously paid for - - - $572.00 3 hydrants, " " " 94.50	666 50		923 18
Total additions to Water Works,		$6,176 61	$6,915 15

EXPENSES AT THE PUMPING WORKS.

Services of Engineer and assts.,	$820 00		
" " Firemen and laborers,	613 68		
Coal, - - - - - -	18 91		
Oil 140½ galls., $128,08, Tallow 227 lbs., $23,84, - - -	151 92		
Packing $27,68, Gas $87, -	I14 68		
Balance of payments for new chimneys, - - - -	66 88		
North smoke pipe, - - -	119 65		
Miscellaneous, - - -	115 37	2,021 09	
Add, Coal used previously paid for, - - - - - -	2,911 62		4,932 71

REPAIRS AND MISCELLANEOUS OPERATING EXPENSES.

Labor—care of pipes, hydrants, stop-cocks, and flushing and repairs, &c., - - - -	$1,458 55		
Watching reservoirs, - -	55 00		
Carried forward, . . .	$1,513,55	$2,021,09	$4,932,71

Brought forward, - - -		$1,513,55	$2,021,09	$4,932,71
Hydrant and stop-cock boxes and iron covers, - - -		96 19		
Repairs north res. tank $38.67, repairs hyd't and tools $73.75,		112 42		
Wagon repairs and horse exp'es,		81 33		
Publishing annual report, -		134 00		
Miscellaneous, - - -		45 22	1,982 71	
Add, water pipe previously paid for,	$32.90			
Deduct, miscellaneous receipts for labor, &c.,	$89.65	56 75		1,925 96

OFFICE EXPENSES AND SALARIES.

Commissioners, Secretary and Superintendent, - - -	$2,100 00		
Clerks $821.18, Collectors and Assessor, $941.12 - -	1,762 30		
Blank books and stationery, -	112 18		
Office rent $600, care office $65,	665 00		
Legal services, - - -	30 00		
Miscellaneous, - - -	70 54	$4,740 02	4,740 02

SERVICE COCKS.

Tappers' services $37, cast iron boxes $62,80, - - -		99 80		
Horse expenses $13 73, blacksmithing $18 10, - - -		31 83	131 63	
Add, service cocks used previously paid for	$61			
Cash rec'd for tapping,	84 23	23 23		108 40

Total operating expenses Jan. 1st May 5th,	$8,875 45	$11,707 09
" addit'ns to Wat'r W'rks Jan. 1st May 5th,	6,176 61	6,915 15
" interest (coms. for paying Jan. coupons),	91 84	91 84
	$15,143 90	$18,714 08

ght forward, - - - - -	$15,143 90
ne—water tax paid back, - - -	40 05
of the City, - - - - - -	305 00
tard & Whitney, due them Jan. 1st, 1861 d since paid, - - - - - -	485 49
	$15,974 44

SEWERAGE DEPARTMENT.

ial Balance Ledger Board of Public Works, Dec. 31, 1861.

	Dr.	Cr.
rs North Division, - - - -	$189,823 86	
rs South Division, - - -	249,347 29	
rs West Division, - - -	229,634 62	
ster Lind, Treasurer Sewerage Com.	107,746 53	
rage Loan Bonds, 6 per cent., -		87,000 00
rage Loan Bonds, 7 per cent., -		835,000 00
rage Loan Bonds canceled, -		18,000 00
rage Sinking Fund, - -		43,490 18
rage Sinking Fund mortgages, -	26,467 10	
unt on Sewerage Bonds, - -	30,220 26	
rage Loan Interest, - -	21,545 97	
yers, - - - - - -		157 50
e Drains, - - - - - -	12,506 05	
rage Pipes, - - - -	12,374 21	
rage Bricks, - - - - -	73 87	
rage Stock, - - - - -	2,261 47	
rican Exchange Bank, - -	31,957 50	
is Coughlin, - - - - -	1,561 51	
ck Smith, - - - - -	1,347 75	
el T. Foss, - - - -		175 00
am Smith & Co., - - -		125 00
a & Chicago Union Railroad Co.,		382 55
rage Fund in the hands of City easurer, - - - - - -		162 47
rage Fund in Marine Bank, -	58,882 84	
rage expense account office, -	6,807 28	
sing sewers North Division, -	3,373 08	
ed forward, - - - -	$985,931 19	$984,492 70

Brought forward, - - - - -	$985,931 19	$984,492 70
Cleansing sewers South Division, -	6,369 21	
Cleansing sewers West Division, -	3,467 52	
Repairs of sewers North Division, -	950 51	
Repairs of sewers South Division, -	786 96	
Repairs of sewers West Division, -	1,214 29	
Cement account, - - - - -	35 63	
Sewerage Sinking Fund in hands of City Treasurer, - - - - -	1,135 05	
Chicago Gas Light & Coke Co., -	31 28	
Expenses in suit vs. S. Lind, et. al., -	22 00	
Z. Cobb, agent, - - - - -	31 53	
Henry Fuller, agent, - - - -	29 44	
Sewerage bills payable, - - -		15 000 00
Lake Street Sewer, - - -		511 91
	$1,000,004 61	$1,000,004 61

SEWERAGE FUND.

Statement of Cash Receipts and Expenditures by the Board of Public Works, from the date of its organization, May 6, 1861, to Dec. 31, 1861, inclusive.

RECEIPTS.

Received at the office of the Board of Public Works, viz: house drain permits, - -	$867 20	
Materials sold and labor performed, - - - -	592 98	1,460 18
Add the following receipts by the Comptroller and City Treasurer, viz: Sewerage tax collected to Dec. 31, 1861, -	$12,853 29	
Received of S. Lind, Treasurer Sewerage Comr's, balance in hands of B. F. Carver & Co.,	50,142 35	
Received of S. Lind, Treasurer Sewerage Comr's, for check		

Sturges B. & Co., on B. F. Carver & Co.,	16,027 70		
Interest collected on collateral of E. I. Tinkham & Co.,	150 00		
Balance in American Exchange Bank, N. Y., in excess of outstanding coupons of Sewerage Bonds, May 6, 1861,	840 98		
Borrowed of S. Sturgis & Sons,	15,000 00	95,014 32	96,474 50
Amount overdrawn with City Treasurer,			162 47
			$96,636 97

EXPENDITURES.

Sewerage interest July 1, 1861, and Jan. 1, 1862, including exchange and interest S. Sturges & Sons,	$62,881 71	
Loss on balance account of Sewerage Commissioners, remaining in B. F. Carver & Co.'s bank,	17,549 82	
Loss on check Sturges, Buckingham & Co. on B. F. Carver & Co., rec'd of S. Lind, Treasurer,	1,717 25	
Construction of Sewers excepting cement used,	1,874 00	
Cleansing sewers,	1,715 60	
Repairing sewers, excepting cement used,	2,318 62	
Cement, $649,47; Shovels, $5,00,	654 47	
Salaries, miscellaneous, office and legal expenses,	6,883 08	
Work for private parties,	158 67	
H. L. Monroe, refunded money advanced by him to Sewerage Comr's,	50 00	
House drains,	833 75	$96,636 97

There has been credited S. Lind, Treas., the balance in the Marine Bank to the credit of the Sewerage Board, and this balance still remains there,		$58,882 84

SEWERAGE SINKING FUND.

Receipts by the Board of Public Works from May 6, 1861, to Dec 31, 1861, inclusive.

RECEIPTS.

Interest on Sinking Fund Mortgage, William Hildebrand, - - -	530 00	
Interest on Sinking Fund Mortgage, Hiram Joy, - - - -	605 05	$1,135 05
In hands of City Treasurer, - -		1,135 05

Cash Receipts and Payments by the Board of Sewerage Commissioners, from January 1st to May 5th, 1861, inclusive, as shown by their books.

RECEIPTS.

City of Chicago. Sewerage tax of 1859 and interest thereon, - -	6,051 56	
Sewerage tax of 1860, - - -	56,490 20	
American Exchange Bank, draft on them, - - - - - -	28,000 00	
Exchange received on above draft and interest on deposit account, - -	2,465 44	
50 sewerage bonds sold April 4th,	50,000 00	
Timothy Wright, money loaned him Dec. 31, 1860, - - - -	3,000 00	
Matthew Conley, money loaned him February, 1861, - - - -	3,000 00	
House drain permits, - - -	345 75	
Pipes and oak sheeting sold, - -	54 00	$149,406 95
There was reported by Sewerage Board cash on hand January 1st, 1861, -		84,652 71
		$234,059 66

EXPENDITURES.

Construction account, - - -	2,500 58	
Cleansing sewers, - - - -	3,758 43	
Salaries, - - - - - - -	4,316 64	
Office rent, - - - - -	351 34	
Office expenses, $83,70; Stationery, $95,97, - - - - - -	179 67	
Coupon account, - - - -	3,158 40	
Repairs of Gas Company's pipes, -	200 29	
Pipes, dockage and storage, $50,00; Implements, $57,66, - - -	107 66	
Bills payable loan of June 1st, 1860,	30,000 00	
Interest on $30,000 loan, - -	1,326 43	
Matt. Conley, temporary loan to him,	3,000 00	
Discount on uncurrent bills, - -	50 40	
Thomas Iago, extra work allowed him,	50 40	
Robert Stewart, advanced by him for Green street sewer, - - -	150 00	
John Tyrell, advanced by him for Wabash avenue sewer, - -	25 00	
Ashley & Norris, advanced by them to pay coupons, - - - -	140 00	
	$49,315 24	
Cash balance as reported by Sewerage Board May 5th, 1861, not including American Exchange Bank balance,	$184,744 42	
		$234,059 66

SEWERAGE FUND.

Detailed statement of expenditures by the Board of Public Works from May 6th to December 31st, 1861, inclusive.

SEWERS—SOUTH DIVISION.

		CASH PAYMENTS.	ACTUAL COST.
Engineer, Draughtsman, Rodman	$176 67		
Labor, - - - - - -	506 27		
Alteration of Gas Co.'s pipes, -	22 66		
Lumber $3,40, Nails .92, Advertising $1,18, - - -	5 50	$711 10	
Carried forward, - - -		$711 10	

Brought forward, - - -		$711 10	
Cost of Lake street sewer, (excepting sewerage pipes used,) advanced by sundry individuals,	$511 91		
Sewerage pipes used in S. Div.,	1,064 95		
Materials used previously paid for	80 00		
Bricks used and not paid for, -	12 07		
Cement account (cement used),	60 42		
Deduct receipts for materials	$1,729 35		
sold and work done, - -	42 34		
	$1,687 01		$2,398 11

SEWERS—WEST DIVISION.

Engineer, Draughtsman, Rodman,	178 00		
Labor, - - - - - -	661 75		
Altering Gas Co.'s pipes, - -	13 26		
Lumber $3,41, Nails .91, advertising $1,19, - - - -	5 51		
Rubble stone $7,85, Miscel's $4,	11 85	$870 37	
Cost of Stewart avenue sewer, excepting pipe, (paid for by G. & C. U. R. R. Co.), -	382 55		
Pipes used, $135; man hole and catch basin cover, $80, - -	215 00		
Bricks used not paid for, - -	102 38		
Cement used, (transferred from cement account, - - -	60 41		
Deduct, - - - - -	760 34		
Labor performed and materials sold, $11,25; pipes previously charged to sewers and now found to be on hand, $400,00,	411,25		
	$349 09		$1,219 46

SEWERS—NORTH DIVISION.

Draughtsman $24, labor $258,67	282 67		
Altering Gas Co.'s pipes, - -	4 36		
Lumber $3,40, nails .92, advertising $1,18, - - -	5 50	$292 53	
Carried forward, - - -		$1,874 00	

Brought forward, - - -		$1,874 00	
Pipes used previously paid for,	60 00		
Man hole and catch basin covers,	40 00		
Cement used, (transferred from cement account,) - - -	6 75		
Deduct, - - - - - -	$106 75		
Receipts for materials sold and work done, $33,13; pipes previously charged up and now on hand, $366,41, - -	399 54		
	$292 79		
Showing an actual credit to this account of, - - - -	.26		

SEWERAGE INTEREST ACCOUNT.

Sewerage coupons, July 1, '61 and Jan. 1, 62, - - -	62,270 00		
Exchange on above, - -	199 08		
Commissions paid Am. Ex. Bk. for paying above coupons and back coupons, - - -	225 14		
Interest on temporary loan, S. Sturges & Sons, - - -	187 49		
Loss on account of B. F. Carver & Co., - - - - - -	17,549 82		
Loss on check paid over by S. Lind, Treasurer, - - -	1,717 25	82,148 78	82,148 78

CLEANSING SEWERS, SOUTH DIVISION.

Labor and superintendence, -	657 00		
Blacksmithing and miscell'ous,	15 87	672 87	672 87

CLEANSING SEWERS, WEST DIVISION.

Labor and superintendence, -	461 37		
Blacksmithing and miscell'ous,	15 38	476 75	476 75

CLEANSING SEWERS, NORTH DIVISION.

Labor and superintendence, -	551 13		
Blacksmithing and miscell'ous,	14 85	565 98	565 98
Carried forward, - - -		$85,738 38	

Brought forward, - - -			$85,738 38	

REPAIRS OF SEWERS, SOUTH DIVISION.

Labor and superintendence, -		546 78		
Lumber, nails and miscellaneous,		27 50	574 28	
Materials used transferred from other accounts, - -	$242 13			
Deduct receipts from sale of materials,	29 45	212 68		786 96

REPAIRS OF SEWERS, WEST DIVISION.

Labor and superintendence, - -		985 65		
Lumber and nails, -		15 98	1,001 63	
Materials used transferred from other accounts, - -	247 40			
Deduct rec'pts from sale of materials,	34 74	212 66		1,214 29

REPAIRS OF SEWERS, NORTH DIVISION.

Labor and superintendence, - -		729 65		
Lumber and nails,		13 06	742 71	
Materials used transferred from other accounts, - -	234 98			
Deduct receipts from sale of materials,	27 18	207 80		950 51

HOUSE DRAINS.

Services of Engineer,		800 00		
Horse keeping, -		33 75	833 75	
Pipe junctions used,	153 60			
Cash receipts and chg. for permits,	872 20	718 60		115 15

Carried forward, - - -			$88,890 75	

Brought forward,		$88,890 75	

SEWERAGE EXPENSE ACCOUNT—OFFICE AND SALARIES.

Commissioners Board of Public Works,	2,499 96		
Secretary $60, Engineer $1,200,	1,260 00		
Clerks $1,916.68, Assistant City Superintendent, $400,	2,316 68		
Office furniture and fixtures,	119 58		
Legal services,	366 67		
Blank books and stationery,	189 84		
Miscellaneous,	57 55	6,810 28	
Deduct am't paid by Z. Cobb for advertising,	3 00		6,807 28
Stock—			
Shovels purchased,		5 00	5 00
Patrick Smith—			
Costs in suit vs. P. Smith and sureties,		50 80	50 80
H. L. Monroe—			
Refunded him his advance Sewerage Board for building a sewer,		50 00	50 00
Expenses of suit vs. Lind et. al.,		22 00	22 00
Z. Cobb—			
Cash paid for sewer constructed for him,		17 44	
Add materials used transferred from other accounts,	14 09		31 53
H. Fuller—			
Cash paid for sewer constructed for him,		9 25	
Materials and permit,	20 19		29 44
J. B. Busch—			
Cash paid for sewer constructed for him,		4 81	
Add materials,	6 84		
Deduct cash received from him,	11 65		
Carried forward,		$95,860 33	

Brought forward, - - -		$95,860 33	
P. & Ft. W. R. R. Co.—			
Cash paid for alterations of sewers to suit rail road tracks, -		120 79	
Materials used, - - -	121 43		
Deduct cash received of P. & Ft. W. R. R. Co., - - -	242 22		
CHICAGO GAS-LIGHT & COKE CO.			
Labor making well cover, - -		6 38	
Materials used, - - -	24 90		31 28
Cement account—			
Cement purchased May 6–Dec.31		649 47	
Transferred to other accounts, used or sold, - - -	613 84		
Total cash payment, - -		$96,636 97	

Cash received by the Board of Public Works from May 6, 1861, to Dec. 31, 1861, inclusive, belonging to other than the Water and Sewerage Funds.

GENERAL FUND.	
Permits for house moving, obstructing streets, &c., - -	$160 95
BOARD OF PUBLIC WORKS APPROPRIATION FUND.	
Received for damage to bridges, sales of materials, &c., -	151 93
CEMETERY FUND.	
Received for vacation of alley, - - - - - -	10 00
	$322 88

CEMETERY FUND.

Statement of Expenditures by the Board of Public Works from May 6, 1861, to Dec. 31, 1861, inclusive.

EXPENDITURES.

Labor and teaming expended in improving grounds of cemetery, - - - - -	2,445 87	
Salary of John C. Ure, Superintendent, -	266 65	
Trees and evergreens, - - - - -	159 00	
Fountain, - - - - - - - -	71 03	
Lumber, - - - - - - - -	44 12	
Nails and hardware, - - - - -	19 23	
		$3,005,90

BOARD OF PUBLIC WORKS APPROPRIATION FUND.

Statement of expenditures by the Board from May 6, 1861, to Dec. 31, 1861 inclusive, being cash payments.

EXPENDITURES.

South Division, streets and sidewalks chiefly,	$ 5,721 98	
West Division, streets and sidewalks chiefly,	7,579 51	
North Division, streets and sidewalks chiefly,	5,045 71	
Public Buildings, - - - - - -	1,445 41	
Bridge Department, - - - - -	10,881 75	
Lumber, (bal. not chg'd to S.W. and N. Div's)	907 45	
Expenses office, - - - - - -	825 20	
Harbor, - - - - - - -	208 75	
Public Parks, - - - - - -	5 76	
Intersection of streets, - - - -	199 65	
		$32,821 17

CITY DEPARTMENT.

Trial Balance, Ledger Board of Public Works, Dec. 31, 1861.

	DR.	CR.
City appropriation fund in hands of City Treasurer, - - - - - -	$51,722 76	
North Division, - - - - - -		$8,658 29
South Division, - - - - - -		4,798 02
West Division, - - - - - -		8,040 32
Public Buildings, - - - - -		1,114 43
Lumber account, - - - - -	464 32	
Bridge Department, - - - - -		6,415 38
City expense account office, - -		724 80
Chicago Harbor, - - - -		291 25
Public Parks, - - - - - -		494 24
City proportional expense account, -		6,850 00
Intersections of streets, - - - -		14,800 35
Special assessments, - - - - -	13,485 59	
Lake street improvement, - - - -		13,261 20
South Water street improvement, -		214 39
Sidewalk improvements, - - - -		10 00
New school houses, - - - - -	10,005 75	
Wabash Avenue school house, - -		8,826 75
Scammon Branch school house, - -		1,179 00
	$75,678 42	$75,678 42

Detailed statement of Expenditures, under the appropriation b the city, for the Board of Public Works, showing the actual cost each account.

Amount appropriated by the city, -	$76,800	00	
Street taxes collected to Jan. 1, '62, -	7,608	00	84,408

EXPENDITURES—SOUTH DIVISION.

Labor on streets and sidewalks, - -	3,654	63	
Services of clerks $164.48, Rodman $5.83,	170	31	
Printing street tax notices and receipts,	23	99	
Distributing street tax notices, - -	242	00	
Lumber, - - - - - - - -	542	99	
Nails and spikes, - - - - -	127	75	
Stone, - - - - - - -	449	99	
Repairs of paving $230.91, tools, $7,27,	238	18	
Paving intersection of Dearborn st. with alley between Lake and South Water,	110	50	
Re-paving gutters on Clark street, bet. Lake and South Water streets, -	85	20	
Altering catch basin cor. Lake and Wells streets, - - - - - - -	23	37	
Building wall on Clark street, - -	40	00	
Hay $2.17, barricades for election $10.90,	13	07	
	$5,721	98	
Deduct am't paid by P. F. W. Peck for repairs of sidewalk $2, gravel sold .50,	2	50	5,719 4

WEST DIVISION.

Labor on streets and sidewalks, - -	$4,919	82
Services of clerks $164.52, Rodman $4.59,	169	11
Printing street tax notices and receipts,	23	50
Distributing street tax notices, - -	300	00
Lumber, - - - - - - -	1,564	25
Nails and spikes, - - - - -	275	36
Stone, - - - - - - -	272	28
Tools, - - - - - - -	41	62

Hay $2.67, barricades for election $10.90	13 57	
	$7,579 51	
Deduct am't paid by C. Stein for sidewalk built, $2.33; gravel sold, $0.50, -	2 83	7,576 68

NORTH DIVISION.

Labor on streets and sidewalks, -	3,555 46	
Nails and spikes, - - -	140 00	
Tools, - - - -	14 06	
Lumber, - - - -	560 38	
Services of clerks $164.51, Rodman $5.83	170 34	
Printing street tax notices and receipts,	20 50	
Distributing street tax notices, -	214 00	
Stone, - - - -	349 43	
Repairs of paving, - - -	8 47	
Hay $2.17, barricades for election $10.90,	13 07	
	$5,045 71	
Deduct stone and gravel sold, -	30 50	5,015 21

PUBLIC BUILDINGS.

COURT HOUSE.

Repairs plastering $5, repairs city treas. office $9.82, - - -	14 82

CITY HOSPITAL.

Roofing engine house $26.14, plumbing $5.75, - - - -	31 89

WEST MARKET.

Repairing roof $28.50, plumbing $31.99,	$60 49

NORTH MARKET.

Plumbing, - - - -	10 44

CITY BRIDEWELL.

Repairing roof, - - -	47 79

ARMORY.

Painting roof $91.12, tin and solder $2.05 - - - -		93 17	

BELL TOWERS.

Labor $75.12, lumber $18.65, -		93 77	

ENGINE HOUSES.

Whitewashing $19.50, carpenter work $328.70, - -	$348.20		
Laying drain La Salle st. Engine House, - - -	21.63		
Lumber $150.43, plumb. $32.57,	183.00		
Plastering $31.00, glass and glazing, $46.50 - -	77.50		
Nails, bolts, hinges and locks, -	36.60		
Laying water pipe, - -	58.04		
Tin and zinc, - -	6.23	$731 20	

LARRABEE STREET ENGINE HOUSE.

Paid Wm. Arend on acct. for build'g,		402 00	$1,485 5

BRIDGE DEPARTMENT.

Carpenter work $77.87, chain $29.09, oil $146.75, - - - - -		$253 71	
Piles $267.56, nails and spikes $95.52, oars $13.44, - - -		376 52	
Hay and oats $26.67, hardware and tools $51.97, - - -		78 64	
Jackscrews $31.50, lumber $346.96,		378 46	
Wells daily list of vessels in port, -		14 50	$1,101

NORTH AVENUE BRIDGE.

Salary of bridge tender, - -		$168 55	
Carpenter work $20.74, iron work $3.08, stove-pipe $5.37, coal $4.20, -		33 39	$201

CLYBOURNE AVENUE BRIDGE.

Carpenter work, - - -			9

CHICAGO AVENUE BRIDGE.

Salary of tender, - - -	350 00	
Carpenter work $18.50, coal $12.60, tools $3.75, lumber $4.25, - -	39 10	389 10

ERIE STREET BRIDGE.

Salary of tender, - - -	350 00	
Carpenter work $9.01, coal $6.30, chain hooks $1.50, - - -	16 81	366 81

INDIANA STREET BRIDGE.

Salary of tender, - - -	350 00	
Carpenter work $12.37, coal $8.40, lumber .72, glass .50, - -	21 99	
Tools and iron work, - - -	5 92	377 91

KINZIE STREET BRIDGE.

Salary of tender, - - -	420 00	
Carpenter work $15.39, bell $9.60, stove bottom $1.05, - - -	26 04	
Coal $8.40, bolts and straps .80, -	9 20	455 24

RUSH STREET BRIDGE.

Salary of tender, - - -	675 00	
Carpenter work $96.83, iron work $120.43, bell $9.60, - -	226 86	
Repairs masonry $10, stove and pipe $5.52, coal $8.40, - - -	23 92	
Lumber, - - - -	4 79	
	$930 57	
Deduct, amount received from sundry vessels for damage by collisions -	82 60	847 97

CLARK STREET BRIDGE.

Salary of Tender, - - - -	675 00	
Carpenter work, 46.23; iron work, 3.13; Coal, 8.40, - - - - -	57 76	

Stove and pipe, 6.50; timber, 7.93; damage to schooner, 119.52,	133 95	866 71

WELLS STREET BRIDGE.

Salary of Tender,	675 00	
Carpenter work, 188.64; iron work, 163.93; bell, 9.60; coal, 8.40,	370 57	
Lumber, 45.41; painting, 38.69; cable and turnbuckles, 100,	184 10	1,229 67

LAKE STREET BRIDGE.

Salary of Tenders,	615 00	
Carpenter work, 40.98; lumber, 7.40; iron work, 11.65,	60 03	
Stove and pipe, 5.87; coal, 8.40,	14 27	
	689 30	
Deduct ams. recd. of schr. Commerce, for damage,	10 00	679 30

RANDOLPH STREET BRIDGE.

Salary of Tender,	615 00	
Carpenter work, 329.23; iron work and tools, 71.99; coal, 8.40,	409 62	
Lumber, 93.43; bell, 9.60; stove and pipe, 6.86; glass, 25 cts.,	110 14	
Plastering and building chimney,	12 00	1,146 76

MADISON STREET BRIDGE.

Salary of Tender,	600 00	
Carpenter work, 35.25; iron work, 51.35; glass, 37 cts.; coal, 8.40,	95 37	
Bell, hangings and freight,	16 82	
	712 19	
Deduct ams. recd. of vessel for damage,	2 00	710 19

VAN BUREN STREET BRIDGE.

Salary of Tender, ...	600 00	
Carpenter work, 57.74; bell, 9.60; iron work, 10.38, . . .	77 72	
Coal, 10.50; lumber, 10.23, . .	20 73	698 45

POLK STREET BRIDGE.

Salary of Tender, . . .	420 00	
Carpenter work, 44.51; iron work and tools, 24.43; oakum, 4.00, . .	72 94	
Lumber, 9.58; dredging, 80.00; coal, 8.40, . . .	97 98	590 92

TWELFTH STREET BRIDGE.

Salary of Tender, . . .	385 00	
Carpenter work, 142.38; iron work and tools, 34.70; lumber, 45.40, .	222 48	
Dredging, 67.00; coal, 8.40, . .	75 40	
	682 88	
Deduct amount received of Barque Republic for damages, . .	5 50	677 38

OLD STREET BRIDGE.

Salary of Tender, . . .	350 00	
Carpenter work, 26.88; iron work and tools, 6.79; coal, 8.40, . .	42 07	
Lumber, ...	2 95	395 02

HALSTED STREET BRIDGE.

Salary of Tender, . . .	183 33	
Carpenter work, 15.75; tools, etc., 2.75; stove and pipe, 4.27, . .	22 77	
Completing approach, 300.00; coal, 4.20,	304 20	510 30

LUMBER ACCOUNT.

Oak lumber purchased to Dec. 31st, .	2,644 42	
Used and charged to various accounts,	2,180 10	464 32

OFFICE EXPENSES.

One-third bill of seal and press, .	10 00	
Stationery and advertising, . .	176 84	
Office furniture, ...	98 33	
Printing, ...	119 96	
Moving safe, 10.; half bill safe, 275.,	285 00	
Postage and petty expenses, . .	10 36	
Legal expenses, ...	116 67	
Daily newspapers, ...	8 04	825 20

HARBOR.

Removing obstructions, . .	118 37	
Repairs of life boats and docks, .	87 38	
Lead lines, ...	3 00	208 75

PUBLIC PARKS.

Repairs of fountains and drinking cups,	5 76

INTERSECTIONS OF STREETS.

Constructing aprons on Lake and South Water streets, ...	199 65
	$32,755 87

SPECIAL ASSESSMENTS.

LAKE STREET IMPROVEMENT.

Amount of assessment roll for paving Lake st. with Nicholson pavement from Wabash av. to the bridge, . .	$28,282 33		
Amount of assessment roll for paving Lake st. with Nicholson pavement from Wabash av. to Central av., . . .	5,341 62	$33,628 95	
Estimates paid De Golyer, McClelland & Co, ...	20,170 00		
Amount paid for inspecting the work, ...	192 75	$20,362 75	
Balance unexpended Jan. 1, '62,			$13,261 02

Amount of contract with De Golyer, McClelland & Co. for paving from Wabash av. to bridge, . .	$22,600 00			
Less allowed by him for old boulders, .	$1,200 00	$21,400 00		
Add, for area walls constructed and extras, ...		1,125 07		
		$22,525 07		
Estimates paid De Golyer, McClelland & Co.,		20,170 00		
Amount yet to be paid De Golyer McClelland & Co., . .		$2,355 07		
Abatement to be made for excess of assessment over cost of work, ...		$5,362 53		
		$7,717 60		
Deduct, area wall constructed, not assessed, ...		27 55		
		$7,690 05		
Estimated balance for expenses making assessments &c., .		229 53	$7,919 58	
Amount of assessment for paving from Wabash av. to Central av., work not yet commenced,			$5,341 62	
				$13,261 20

SPECIAL ASSESSMENTS.

SOUTH WATER STREET IMPROVEMENT.

Amount of assessment rolls for paving So. Water st. from Dearborn st. to River st., ...		$8,849 31
Paid A. McBean, contractor, for paving above, ...	$7,005 00	

Amount of abatement for area walls constructed by owners,	339 27	
Amount of abatement for excess of assessment over cost of work,	1,290 65	$8,634 92
Balance for expenses making assesssments, &c.,		$214 39

SIDEWALK IMPROVEMENTS.

Amount of assessment roll for costructing sidewalk opposite lots 16 and 17 in Block 9 in Fort Dearborn addition to Chicago,		$162 23
Paid Alvin Salisbury, contractor, for building same,	$130 00	
Amount of abatement for excess of assessment over cost of work,	22 23	$152 23
Balance reserved for expenses making assessment, &c.,		$10 00

NEW SCHOOL HOUSES—WABASH AVENUE SCHOOL HOUSE.

Amount of contract with W. H. Carter for masonry,	$7,850 00	
Amount of contract with E. Walker for cut stone work,	1,239 00	
Amount of contract with T. Maenard for carpenter work,	5,250 00	
Amount of contract with M. Greenebaum for roofing,	1,360 00	
Amount of contract with M. B. Vanderkooi, for painting &c.,	909 00	$16,608 00
Estimates allowed W. H. Carter on contract,	$5,781 25	
Estimates allowed T. Maenard on contract,	850 00	
Estimates allowed E. Walker on contract,	850 00	
	$7,481 25	

Amount allowed G. P. Randall architect on acct. of plans and superinten'ce,	300 00	$7,781 25
		$8,826 75

SCAMMON BRANCH SCHOOL HOUSE.

Amount of contract with T. Maenard for carpenter work, ...	$1,975 00	
Amount of contract with W. Barker for masonry, ...	365 00	
Amount of contract with H. Schlau for painting, &c., ...	260 00	$2,600 00
Estimates allowed T. Maenard on contract, ...	$1,200 00	
Estimates allowed W. Barker on contract, ...	181 00	
Estimates allowed H. Schlau on con'ct,	40 00	$1,421 00
		$1,179 00

SECOND ANNUAL REPORT

CHICAGO HISTORICAL SOCIETY.

BOARD OF PUBLIC WORKS

TO THE

COMMON COUNCIL

OF

THE CITY OF CHICAGO.

APRIL 1st, 1863.

CHICAGO:
TRIBUNE BOOK AND JOB PRINTING OFFICE, 51 CLARK STREET.
1863.

VDDA
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SECOND ANNUAL REPORT

OF THE

BOARD OF PUBLIC WORKS

TO THE

COMMON COUNCIL

OF

THE CITY OF CHICAGO.

630
3

APRIL 1st, 1863.

CHICAGO:
TRIBUNE BOOK AND JOB PRINTING OFFICE, 51 CLARK STREET.
1863.

OR LIBRARY
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1882
427

BOARD OF PUBLIC WORKS.

COMMISSIONERS.

BENJAMIN CARPENTER, *President.*
FREDERICK LETZ, *Treasurer.*
JOHN G. GINDELE.
FRANCIS C. SHERMAN, *Mayor,*
And ex officio Member of the Board.

OFFICERS.

A. W. TINKHAM, *Secretary.*
E. S. CHESBROUGH, *City Engineer.*

COMMISSIONERS' REPORT.

OFFICE OF THE BOARD OF PUBLIC WORKS,
CHICAGO, April 25th, 1863.

To the Mayor and Aldermen of the City of Chicago, in Common Council assembled:

The Board of Public Works respectfully submit herewith a report of their acts and doings for the fifteen months ending the first of April, as required by the provisions of the revised City Charter.

WATER WORKS.

No large additions to the works have been made during the period covered by this report, other than in laying down distributing mains.

DISTRIBUTING PIPES LAID.

50,881 feet, or 9 $\frac{3361}{5280}$ miles, of distributing pipes, of 4, 6 and 8 inches diameter, have been laid down, the amount in the three divisions of the city being as follows, viz.:

South Division,	- - - - -	11,426 feet.
West "	- - - - -	26,271 "
North "	- - - - -	13,184 "
		50,881 feet.

The whole amount of distributing mains now in connection with the works, is 98 miles and 2,643 feet.

The supply mains, not included in the above, are in length 6 miles and 2,247 feet, making the whole amount of pipes laid in the city, of all sizes, 104 miles and 4,890 feet.

COST OF THE WATER WORKS, AND HOW PAID FOR.

The Water Works had cost, at the first of the present month, - - - - - - - -	$1,118,494.9
There have been issued six per cent. Water Loan bonds, amounting to $1,030,000, which were generally sold at their seven per cent. par value. Deducting, for the discount thus made, $82,235.41,	947,764.59
Seven per cent. Water Loan bonds sold at par,	103,000.00
Balance derived from Water rents, - - -	67,730.38
	$1,118,494.97

INCOME OF THE WATER WORKS.

Water rents received from January 1, 1862, to March 31, 1863, inclusive, - - - -	$188,448.28
Profits tapping pipes, - - - - -	846.52
Total income for fifteen months, - -	$189,294.80

EXPENSES AND REPAIRS OF WATER WORKS.

Interest on water loan bonds, - - - - - -	$71,306.77
Expenses at pumping works for 15 months, as above,	20,471.16
Miscellaneous repairs, including new inlet house, and dredging basin, - - - - - - - - -	9,649.26
Miscellaneous operating expenses, - - -	21,187.32
Total for the fifteen months, - - -	$122,614.51

Besides the above, there were expended by the Board, in laying distributing mains, - - - - -	$39,197.17
Making other permanent additions to the works, -	$5,031.44

QUALITY OF THE WATER.

Last spring, at the time of the spring freshet, the accumulations which had gathered in the river, and under the ice, during the winter, were suddenly discharged into the lake, and by the southerly winds that then prevailed, were forced along the lake shore, north of the river, for a long distance, rendering the water very bad for three or four days. Since that time there has been little cause for serious complaint. The water has been good, with but one or two exceptions.

The opinion was expressed in our last report, or that for the year 1861, that measures then proposed, would, when carried out, rid the water of the small fish which were then so abundant as to make the water in some localities very offensive, and in fact caused more complaint as to the quality of the water than anything else. It was only at the beginning of last winter that the new inlet house, the proposed means to exclude the fish, was got into use; and since then they have been kept out of the pipes. They have been kept out, however, only through constant watching day and night, and cleansing and maintaining in good order the various screens through which the water passes. At the mouth of the inlet, the water has swarmed with them all winter long.

The Board have not been idle during the year in regard to the measures to be taken for permanently bettering the quality of the water, so that it shall not be liable to be reached by any of those influences which now occasionally injuriously affect it, and in particular that it may be secure from the discharge from the river. During the year, the subject has been under continual examination and discussion, and such surveys have been made as have seemed necessary.

It will be readily apparent to those who have considered the subject at all, that a change in the supply of water to be furnished to the city, whether it be effected by erecting pumping works in another locality, or by conveying water from another part of the lake to the present pumping works, cannot be effected by any hastily gotten up contrivance, or by any work of small cost. The change will require a good deal of time and money.

PROPOSED PLANS FOR IMPROVING THE QUALITY OF THE WATER.

In discussing the various projects which have been examined for improving the supply of water, the Board have come to the following conclusion:

That what is most to be desired by the city is, that the supply should be drawn from the deep water of the lake, two miles out from the present Water Works, where the water is subject to no impurities, except occasionally the slight milkiness which the lake has after a long continued north-east blow, and where it is clearer and cooler in summer than in shallower waters, and where also the lake is not affected by the discharge from the river, as it is during an unusual freshet along shore for several miles, north and south of the harbor.

We believe that it is very generally admitted by the citizens, that water obtained at a distance from the shore, as stated above, would be purer and better than could be had otherwise, but the difficulties which attend the making and maintaining of a conduit running two miles out into the lake have been considered to be so great, that there is a general apprehension that while it is very desirable that the supply should be obtained thence, it is not possible within any reasonable limits of expense, and we confess to having had the same fear ourselves.

The careful investigation of the subject has satisfied us sufficiently to say, that with our present knowledge, we consider it practicable to extend a tunnel of five feet diameter the required distance under the bed of the lake, the mouth or inlet to such a conduit being the outmost shaft, protected by a pier, which will be used in the construction of the tunnel.

All soundings and excavations show that underlying the site of the city, and under the lake, is a stratum of clay of great thickness. It is believed that in this clay a tunnel of the size proposed, can be constructed without serious difficulty.

The most difficult operation connected with its construction, the Board believe to be the placing of the piers as proposed, at each half mile from the shore, within which shall be sunk cast iron shafts, from which the tunnel shall be worked either way towards and from the shore. Work of this character is very troublesome, and is liable to more or less partial failures. The experience in regard to such constructions on the lake is, however, very considerable, and sufficient to induce in us the hope that the piers can be built and maintained while the tunnel is being constructed, and within reasonable limits of expense.

The only doubts the Board have about the feasibility of the tunnel, grow out of the question as to the practicability of *building the piers*, and of maintaining them exposed to the violence of the lake storms as long as will be necessary in the construction of the tunnel.

For all the details of this project we beg to refer you to the report of E. S. Chesbrough, the City Engineer, submitted herewith. During the year he has labored to obtain all the information which would throw light on the various means thought of, for bettering our supply of water, and to his conclusions as set forth in his report, we invite the careful consideration of your honorable body and of the citizens generally.

At the time of the freshet already referred to, when the water was so very bad, a great many observations were made by the Board, especially to determine how far in various directions the river discharge affected the lake water. Along the lake shore and for five miles north of the Water Works its effect was very marked—the water was almost as bad as abreast of the city. Its influence was felt along shore much more than five miles, but its northern limit was not determined. Southward, some three miles from the mouth of the river, similar observations were made near the shore, showing the water to be bad there also, but better than it was along the lake shore the same distance north of the mouth of the river. At the same time observations were made running out from the pumping works into the deep water of the lake for several miles distance from the shore. At the distance of one mile from the shore, no trace by taste, smell or appearance could be detected of the effect of the discharge from the river. The water was there apparently quite pure, and so continued as the distance increased from the lake shore.

Since these observations were made, the effect of the river on the lake water has at no time been very marked, and no good opportunity has occurred of renewing them, but the river was in an extremely offensive state when that freshet came, from having lain nearly stagnant and covered with ice, and gathering filth all winter long, and it was forced at once in a mass into the lake. From these and other circumstances attending the freshet, its effect on the water of the lake was greater than was ever known before. We hence think it safe to conclude, that the water of the lake is not likely ever to be acted on by the river much more than a mile out from the shore, and that at that distance from the shore there is much greater security from the contamination of the river, than along the lake shore, for several miles, both north and south of the river.

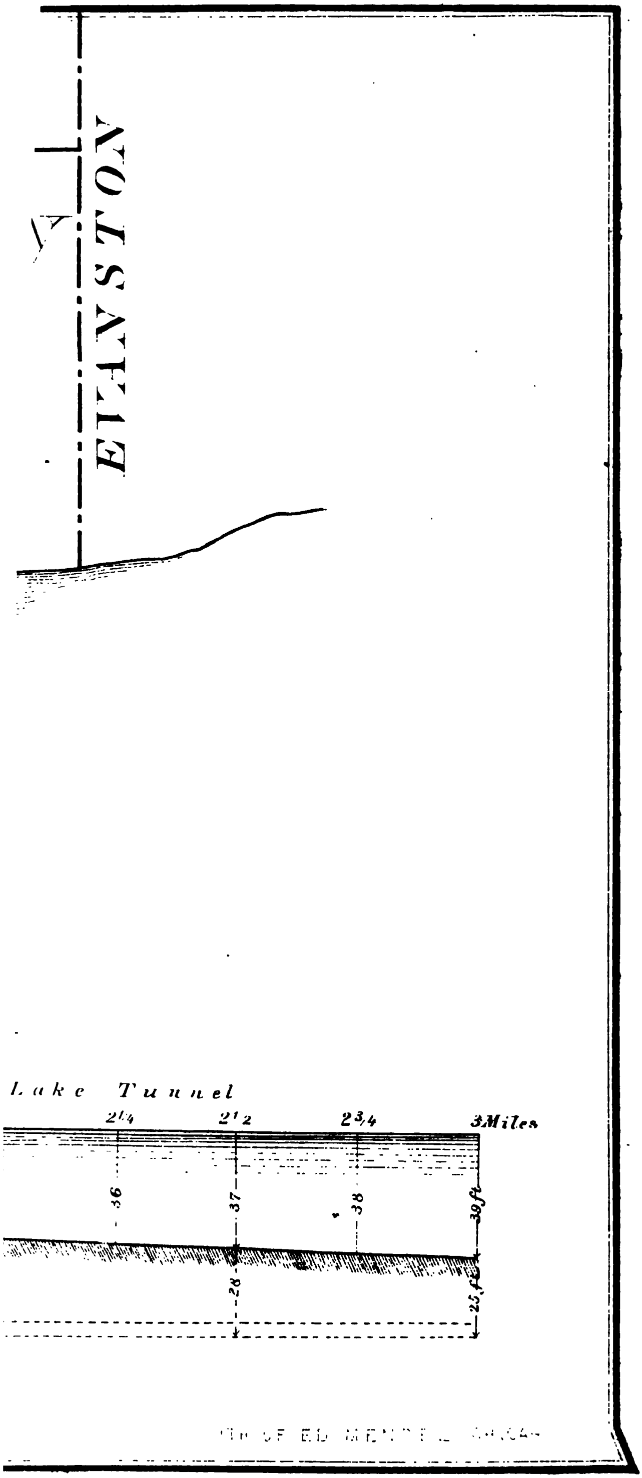
It will be well perhaps to remark here, that the turbidness which the water supplied by the works has during much of the spring and occasionally during the year, does not arise from any mi of the river with lake water. It might almost be said tha never more likely to be free from it than when having this ap ance. The water of the lake always has this turbid, appearance after agitation by winds, especially by north-ea winds; and for miles out from the shore, the lake will be more or less thus discolored, becoming not clear even a distance of five miles from the shore. It arises from the a of the waves on the clay and gravel banks bordering the la the north. We do not think that it is in any way injurious the water, at the distance of two miles from the shore, will very much less of it than the water near the shore.

Recently observations were made during the prevalen easterly winds, when the waters of the lake were turbid, as above, at Winnetka, fifteen miles north of here, and at the time at the pumping works. Specimens of the water were at the shore, at both localities, and at half mile distances o five miles. The Winnetka water was apparently a little turbid than the water off the pumping works; otherwise was no perceptible difference in the specimens taken. increased turbidness of the Winnetka water was owing, doub to the fact that there the lake washes against banks of clay, here against shores of sand and gravel.

The estimated cost of the tunnel extending two miles out the lake from the pumping works, is $307,552.

This estimate does not include, however, any provision light house, which it will be necessary to place on the outside if it be allowed to remain above or near the surface of the after the tunnel is built.

One other project which has been discussed is, to make the lake shore some five miles north of the present pum works, a large, natural filtering or settling basin, from which water shall be conveyed to these works by a five foot aqueduct. For settling and freeing the water from sediment, are of the opinion that the basin would be found effective, would continue to be so, but that for filtration it is not safe to upon it. There have been filtering basins of this character other places. Some of them appear to have continued to wo well during long use, and others have failed and become usele



LITH OF ED MENDEL CHICAGO

The greatest objection to this project is, that the water will be taken along the lake shore, where the water will not be as good as that taken from where the lake is deeper. It will be remembered too, as already stated, that the river discharge a year ago followed along the lake shore more than this distance of five miles, and its presence was very noticeable here; neither settling nor filtration would remove the taste of it. The cost of this basin and aqueduct is estimated at $300,575.

It has been suggested too, that instead of tunneling under the lake abreast of the city, it will be safer to get away a greater distance from the mouth of the river, and that starting from the proposed location of the basin spoken of above, and in place of it a tunnel be run out under the lake as far as may be thought necessary, and an inlet at the shore be also made, the water to be conveyed by a brick aqueduct to the present pumping works. The estimated cost of five miles of aqueduct of a diameter of five feet, and one mile of tunnel of the same size, with an inlet pipe and gate house, so that the water can be taken by an inlet near the shore or through a tunnel from the deep water as may be preferred, is $380,000.

That you may more conveniently compare the cost of the three projects, which have been briefly described, we give again their estimated expense:

To obtain water by running out from the pumping works two miles, and to a depth of thirty-five feet, by a tunnel five feet in diameter, is estimated to cost without a light house, - - - - - - -	$307,552
To construct a filtering or settling basin on the lake shore, five miles north of the Water Works, and to convey the water thence to the works by a five foot brick aqueduct, is estimated to cost - - -	$300,575
To obtain water from five miles north of the works and one mile out into the lake, (depth thirty feet if the same as one mile off the pumping works), by a five foot tunnel and aqueduct, with the inlet and gate house referred to, is estimated to cost - - -	$380,000

We accompany the report with a small map illustrating these various projects.

In another part of this report will be found recommended a plan for purifying the main Chicago river, and the South Branch north of North street. It is safe to suppose that any arrangement which will produce a constant current in the river, or which shall otherwise purify it, will also lessen or prevent the injurious action of the river on the lake water.

Having thus set before you our views as to the best means of so obtaining a supply of water that it shall never be made impure by the river, we can hardly with propriety omit saying, that it has been with great regret that we have observed the serious misapprehension by many of our citizens, in regard to the ordinary condition of the water supplied by the works, and a disposition to exaggerate what real but occasional trouble has existed in regard to it. Ordinarily the water of the city is as good as that furnished to any city. Only during the freshet alluded to was the water seriously contaminated by the river discharge ; once or twice since then, has it been slightly affected by it, but that is all. The turbidness arising from northerly and easterly winds is harmless, and is found everywhere along the shore of the lake, but it has been made the occasion for statements that the daily drink of our citizens is the discharge of the sewers, the refuse of slaughtering establishments, etc. Such statements are wholly untrue, and cannot fail to do harm.

AMOUNT OF WATER LOAN BONDS WHICH CAN BE ISSUED.

The authority given to the city, to borrow money on account of the Water Works, is believed to be more than sufficient for any works which will have to be undertaken, whether for bettering the quality of the water, or for enlarging the works to keep up with the growth of the city. It will be necessary soon to erect another large pumping engine, and the annual expenditures for extending the distributing mains is ordinarily as much as $50,000.

It will be observed that the revenue, besides paying the annual interest, operating and keeping the works in repair, affords a surplus, which whether used in the purchase of outstanding bonds, or in enlarging the works, and so increasing their revenue, as is authorized by the lately revised city charter, goes to securing the payment of the loan. The Board have had no occasion to issue any water loan bonds during the period covered by this report.

Of the loan authorized Feb. 16, 1857, there remains to be issued,	$187,000
The recently revised city charter authorized an additional loan of	500,000
Whole amount authorized to be issued in addition to those now outstanding, is	$687,000

CHANGE OF WATER TAX LAW.

Among the changes made in the recent revision of the city charter, was one making the water tax in all cases a lien upon the lot, as well as upon the building, whether the lot and building are owned by the same owner, or by different owners, and providing for the sale of the lots at the annual city tax sale, if the tax remains unpaid for a specified time. Both of these provisions will be found to be beneficial to the city.

WATER METERS.

The Board have found it advantageous to increase the number of meters, and believe that their use is satisfactory generally to the parties whose rates are determined by them, as well as to the Board. There are now on hand seventy-six water meters, all of the Worthington patent, and there have been ordered twenty-three more. The water rates determined by meter during 1862 and the first quarter of 1863, amount to between $17,000 and $18,000.

PIPE CONTRACTED FOR.

The Board, late last season, agreed with Messrs. R. D. Wood & Co., of Philadelphia, for the delivery of 700 tons of four, six and eight inch pipes as soon as practicable after the opening of navigation, 300 tons at the price of $41, and 400 tons at the price of $46.50 per ton of 2,000 lbs.

CHICAGO RIVER.

Much attention has been given by the Board to the means to be adopted for purifying the river. The cleansing or flushing of the river, by the introduction of lake water in large quantities by communications connecting the lake with the North and South Branches, is apparently the best of the various methods suggested, and we have no doubt that the river could be kept comparatively pure in this way, and so that it would never become offensive. Without however, at present, proposing the construction of the largest of such works, we recommend that the first work of this character to be undertaken, be an aqueduct, to be made through North street, connecting the lake with the river, and that the necessary machinery be erected for pumping the lake water into the river in such quantity as to change the water between North street and the mouth of the river once in twenty-four hours when necessary.

The proposed aqueduct will be circular in form, twelve feet in diameter, and covered, the top of it being several feet below the level of the lake. The pumping machinery can be arranged to pump both from the lake into the river, and from the river into the lake.

It is believed that the water to be forced through this canal, will keep sufficiently pure all of the main river, and all of the South Branch between the main river and North street. The North Branch and that part of the South Branch south of North street, may not be materially benefited by it. If it is found to work well, a similar construction can afterwards be made for flushing out the North Branch.

It is proper to remark, that while it is probably true that the beneficial effects of the North street canal will not be felt beyond the district named, it will nevertheless remove all *sewerage* matter discharged into the river. Every sewer outlet on the river or its branches, is along the main river and the South Branch north of North street. Whatever of filth is generated in the South Branch south of North street, and in the North Branch, by slaughtering establishments, distilleries, etc., is made in defiance of the city ordinances.

The estimated cost of the covered brick aqueduct, with its pumping machinery complete, is - - - -	$140,000
There will be an estimated annual expense connected with the machinery, for coal, services of engineer, fireman, etc., and for repairs, of - - - - -	$7,500

These two works, that suggested for improving the supply of water to the city, and this last for purifying Chicago river from its mouth to North street, we present for your consideration, and request that you will as soon as practicable take action with reference to them. If approved by you, we recommend that an ordinance be passed authorizing this Board to take immediate steps for their construction.

SEWERAGE WORKS.

15,685 feet, or about three miles of sewers were built during 1862, making now the whole amount of public sewers laid, $57\frac{1138}{5280}$ miles. The sewers built last year were generally brick sewers, more than half the amount being of sewers of 4½ feet diameter.

The cleansing of the sewers for the fifteen months ending April 1, 1863, cost - - - - - -	$4,897.24
The repairs of the sewers for the same period, cost -	3,024.07

The balance of account in our last report, stated to be due from S. Lind, Treasurer of the late Sewerage Board, has not yet been paid. The amount now charged to him is $108,696.53.

By the late charter amendments, an additional issue of sewerage bonds of $500,000 was authorized.

GENERAL CITY DEPARTMENT.

STREETS AND SIDEWALKS.

During the two years since their organization, the Board have endeavored to keep the streets and sidewalks of the city in as good condition as was possible, with the limited amount of money at their disposal. Good streets and sidewalks are essential where much business is transacted. In a large city everything must be done that is possible, to make the transportation of merchandise easy, and to facilitate the movements of persons and vehicles. The street improvements of Chicago have hardly kept pace with its buildings, and with its various private enterprises. Some of them, as for instance Lake street, are of the best description, and in good order, but this is not their usual condition. All of the principal thoroughfares connecting the city with the country are very much out of repair, and cannot be brought into good condition without making them anew, at a large expense. Nearly all of the graveled and macadamized streets made before the formation of the Board, are very much out of repair, and ordinarily the streets are not kept up to a good condition after being once improved. The usual way, heretofore, has been to improve a street, and then do but little until the pavement or other prepared road covering was worn out and required an entire renewal, the streets in the meanwhile getting in worse and worse condition, and being more or less unserviceable after the first year or so of use. Nor is it possible to have it otherwise, unless the city will expend more money on the streets than has been appropriated for the use of the Board. As much money should be spent annually on the streets as shall be necessary to maintain them in their original shape, and with as good a surface as shall be practicable with the wearing away of the material covering the street. The larger our city has become, the smaller have grown the appropriations for keeping the streets in good repair, as will be seen by the following statement.

Including the street taxes collected annually, there have been expended for street cleaning and repairs in the three divisions of the city, during each year from 1857 to the present time, about the following sums:

In the year 1857, - - - - - - -	$70,260 *
" " " 1858, - - - - - -	69,502 *
" " " 1859, - - - - - - -	54,568 *
" " " 1860, - - - - - -	40,535 *
" " " 1861–2, (Board of Public Works), -	35,200 †
" " " 1862–3, - - - - - -	30,636 †

The estimates of the Board for the two years 1861 and 1862, were respectively, $54,600 and $58,000, and the appropriations $32,000 and $20,666, and the street taxes, amounting—including the expense of their collection—to about $10,000 more. The Board must always have available some money with which to buy plank and stone and other materials at the beginning of the fiscal year, before collections can be made of the general taxes, and so by stinting, managed to have some $7,000 unexpended at the close of their first year, with which to buy oak and pine lumber, gravel, stone, etc., at the commencement of 1862.

The appropriation by the Council last year for all expenditures on the streets, alleys and sidewalks, was $20,666, or but about one twenty-seventh part of the whole tax levy. The condition of the streets is a matter of such general interest, that the Board can hardly believe that the citizens would be unwilling to increase this small tax to three or four times the above amount, if by so doing they can have better streets.

The ordinary repairs of the streets in our judgment should be paid from the general fund, and not by special assessment. It is especially unjust to impose the whole burden of keeping our leading thoroughfares in good condition upon those few lots which abut on the thoroughfares, while the whole city wears out and is benefited by these highways.

We especially urge upon the Council that the past system of neglecting our streets when once improved until wholly worn out, ought now to end, and that sufficiently liberal appropriations be

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* Not including culverts, which were built by special assessments.

† Including culverts.

hereafter made, to enable the Board to keep in good repair as long as may be possible, such streets as have been lately improved, or which you may hereafter order to be improved. This is especially important in regard to graveled and macadamized streets.

The subject is one of so much importance, that we trust we shall be excused in setting before you at some length, our views as to the various ways in which the streets of the city have been improved.

Before the enlargement of the city by the late charter amendments, there was in the city the following length of streets, every mile of which needed more or less labor :

In the South Division, - - - - -	77½	miles.
" West " - - - - -	207½	"
" North " - - - - - -	78½	"
Total, - - - - - -	363½	"

Included in this amount of streets were the improved streets within the former city limits, measuring about as follows:

Nicholson pavement, - - - - - -	1⅘	miles.
Block stone, - - - - - - - -	1	"
Boulder or cobble stone pavement, - -	2½	"
Macadamized or graveled streets, - -	22	"

There are now in the city more than 400 miles of streets.

The permanent improvements of the streets began about the year 1855, and have been made in the various ways just enumerated.

NICHOLSON PAVEMENT.

So far as our present experience goes, the Nicholson pavement is the best adapted to our most important streets where the buildings are of a permanent character, and the traffic large. As our experience in regard to this pavement dates back no farther than 1856, we can only say, that after between six and seven years heavy wear, as at Wells street between Lake and South Water, the pavement is yet in good condition, and seems likely to last a considerable time longer. Blocks of pine taken out last year from this Wells street pavement, were worn down in height but half an inch, then measuring five and a half inches, their first height having been six inches. Pine we have thought preferable to oak, as the softness, toughness and elasticity of the same admits the impression of the fine gravel on the top of the blocks, thus making a very hard surface, and with the spreading and brooming of the blocks at their edges closing almost the whole joint between them, so that in connection with the saturation by the tar, it is completely protected. Such pine blocks taken out at the intersection of Wells and Lake streets after six years wear, had a perfectly sound appearance, as if put in but the previous month.

BOULDER STONE PAVEMENT.

The boulder stone pavement has been put on several of the most traveled streets. In Lake street the boulder pavement was ruined in five years, and was replaced by the Nicholson pavement in 1861. The pavement in South Water street, of the same kind, is almost ruined, and needs a thorough repair. Clark street, between Lake and South Water streets, was re-paved last year, and the same process will be required again at least in two years. Randolph street, between Michigan avenue and the bridge, was paved with boulders in the fall of 1857, and will soon need repairing from State street to Market street. In streets less traveled than the above named, this pavement shows less holes than in them, but it still has so much unevenness that teams avoid it wherever the Nicholson pavement is near to it in a parallel line. The boulder stones are very unequal in size, and therefore render an unequal resistance to impression. They are of a poor quality, as almost half of those brought to this market are very soft and marly, and cannot withstand the influence of the temperature. A selection of the best of the boulders in size and quality would make the boulder pavement cost almost as much as the Nicholson pavement. If good and sound boulder stones, nearly equal in size, could be got at a reasonable price, the Board would consider such a pavement suitable for streets not subject to heavy teaming.

BLOCK STONE PAVEMENT.

Some of the streets have been paved with block stone or limestone pavement. The blocks are of soft limestone, with many seams. If such blocks were on their bottom beds of the same size as on the top, such a pavement would resist far better the weight of heavy teams than it now does. But as the stones, as put in by the contractor, are generally of unequal size and smaller on the bottom than on the top, the pavement settles unequally, and the corners on the joints and larger pieces are broken off. Thus holes will appear more and more, and the joints will wear out, so that the felloes of wagons will be forced between the blocks, as can be seen in South Water street, between Wabash avenue and Michigan avenue. In streets without much heavy traffic, as Washington street, La Salle street and others, this pavement may last a number of years, but with more or less jar and noise, as with the boulder pavement.

MACADAMIZED AND GRAVELED STREETS.

In regard to most of our macadamized and graveled streets, much is to be done and a thorough reform is required. The city has at this time twenty-five miles of macadamized and graveled streets. Whoever has observed the improvement and construction of such streets, built since 1856, as for instance, Canal street, Milwaukee avenue, Rush street, Kinzie street, State street south of 12th, Archer road, etc., must have seen that all sizes of stones, large and small, and of different shape, have been thrown in the street without much selection, and covered with a thin course of finer stones. On those streets large stones up to the size of one-half of a cubic foot can be seen to-day mixed up with smaller stones. Many of the streets have been built of stones greatly differing in size and having an unequal ability of resistance, including limestone and Joliet gravel. Very much depends upon the manner in which such streets are constructed. When the large stones are put first on the ground carefully, then smaller ones above the same, and the smallest on the top, a street can be built tolerably well. A sample of such a street can be found on Old street, from State street to Old street bridge, on which many and heavy teams are passing daily. The surface consists of very small stones, equal in size, and forming a very hard and compact mass, the material used being limestone.

Samples of good graveled streets we have on Madison street, between State street and Michigan avenue, and also in front of the Terrace Block on Michigan avenue, between Van Buren and Congress streets. Both of these graveled streets have been constructed with care, and such streets as these can be recommended for avenues without a heavy travel. As the Mount Joliet gravel contains a considerable amount of fine sand and marly stuff, which cannot resist the influence of the temperature, frequent heavy teaming will, and always has, cut into and ground up such streets. The big stones are forced to the top, and in dry weather the street is very dusty, and in rainy weather is almost impassable with mud. State street south of Twelfth, Clark street, and Kinzie street, show the truth of this statement.

After various streets of the above kind had been constructed, up to the year 1859, either the idea seemed to prevail that such new streets did not require any repair for a long time, or else, though such repair was known to be necessary, the city did not provide sufficient means to preserve them in good condition. Yet the expenditures on the streets in the years 1857–58–59, were twice as much as under the Board in 1861–62. The injurious results of neglecting these streets, whether it was done from one cause or the other, have long been apparent, and are daily increasing. The slight repairs which were attempted did not take place until the streets were in an almost impassable condition, and cut through to the ground, and so filled with numerous mud holes, which swallowed down the material soon after it was thrown in. In this condition the Board found many of these streets, and with the limited means placed at our disposal, we have been unable to remedy the evil, already of great extent.

It is an old rule that a street should always be kept as near as possible in its original shape, and in keeping the streets in good order, it should be observed as a matter of economy. But if a street is neglected to such a degree as has been usual with our leading thoroughfares, it will be difficult, and very expensive, to restore it to a satisfactory condition.

The Board have built up to this time two macadamized streets of bituminous limestone, namely, Monroe street, from State street to Clark, and North Wells, from Kinzie street to Green Bay road. The original manner in which macadamized streets were built, has been considerably improved during a number of years, and after many experiments by French engineers, a system has been adopted which affords great advantages over the old method, and gives much satisfaction. Precisely the same system of construction was applied to these two streets. The average thickness of the stone body is fifteen inches, and it was put on in two different courses. The lower course consists of broken stones in size from two to three inches, and was eight inches thick. The upper course had a thickness in the center of ten inches, and on both sides of four inches, averaging seven inches, with stones in size from one-half inch to two inches. Each of the courses was rammed separately with a heavy roller. For filling up the interstices between the stones, and to effect a solid bond of the mass, a course of fine cement gravel and fine limestone screenings two inches thick was put on the top. Although the size of the stones in the top course does not fully answer to the size as put down in the specifiations, on account of a defect in the machinery at the quarry, these streets are, nevertheless, good samples of their kind, and they will always remain in good condition while kept in their original shape and crown. Already these streets ought to be filled up, particularly North Wells street, about three inches for a width of ten feet in the center.

According as the material of a street is hard or soft, and the street narrow or broad, and as it shall be more or less traveled, in a corresponding degree will it wear out. In the middle of the traveled way this wear may yearly amount to from two to four inches, and in the average from four to eight per cent. of the whole body of stone. Supposing that a street like Wells street cost $10,000 per mile, which is not quite the real cost, the annual repairs to keep the street in the original shape would amount, at eight per cent., to $800. Now if the present system of leaving the streets without the necessary repairs be continued, Wells street will be ruined in six or eight years, and for more than half this time will be rough and inconvenient, and finally almost impassable. To have it then in sixteen years in good condition and in the original state, it will be necessary to rebuild it twice or twice and a half, at a cost (including interest) of from $25,000 to $35,000. On the other hand, if the shape and form of the street be kept in the original state by an annual expense of $800, the whole amount in sixteen years, including interest, would be but $18,560, which amount paid in yearly sums of $800 each, could hardly be considered a burden for the tax payers. This shows conclusively that the present system gives us poor streets most of the time, and is very expensive. The Board cannot too strongly urge this matter upon your attention, and they ask that hereafter adequate means be provided for keeping these streets in repair after they are once made.

To have at hand stone material for repairing the streets, the Board urgently recommend the purchase by the city of a suitable tract of land for a good limestone quarry, with two stone-breaking machines. The benefit of having a quarry belonging to the city would be very great. The Board would thus be enabled to get stone in such quality and quantity, and at such times as would be most suitable.

SIDEWALKS.

The frequent complaints about defective and irregular sidewalks have much embarrassed the Board, while in many cases we have been powerless to satisfy them. The Board had no right to build sidewalks under the old charter, nor indeed to repair them, nor had we the funds to pay for much of such work. A considerable portion of the street fund so spent on places really dangerous, was expended to prevent injury to persons and damages to the city. To prevent accident, the Board ordered their foreman to repair all such places, wherever found. Under the amended charter, the process for building and repairing sidewalks is more summary; and it may be hoped, that after the Council has passed the ordinances required to enforce its provisions, there will be less difficulty and delay in compelling parties to make needed walks or repairs.

STREET IMPROVEMENTS PAID FOR BY SPECIAL ASSESSMENT.

The following streets were improved during 1862, and paid for, or to be paid for, by the owners of property abutting thereon:

Nicholson Pavement.

Lake street from Wabash avenue to Central avenue.

South Water street, from Franklin street to Lake street.

Boulder Stone Pavement.

Clark street, from Lake street to the bridge.
Kinzie street, from Clark street to Wolcott street.

Macadamized.

North Wells street, from Kinzie street to Green Bay road.
Monroe street, from Clark street to State street.

Graveled.

Wabash avenue, from Lake street to South Water street.

BRIDGES.

Two new pivot bridges were built in 1862; one at Wells street, costing $6,000, and one at Clybourne avenue, the half cost paid by the city being $1,000.

PUBLIC BUILDINGS AND HARBOR.

The appropriations for these objects were limited, and the expenditures have been generally for ordinary repairs.

PUBLIC PARKS AND CEMETERY.

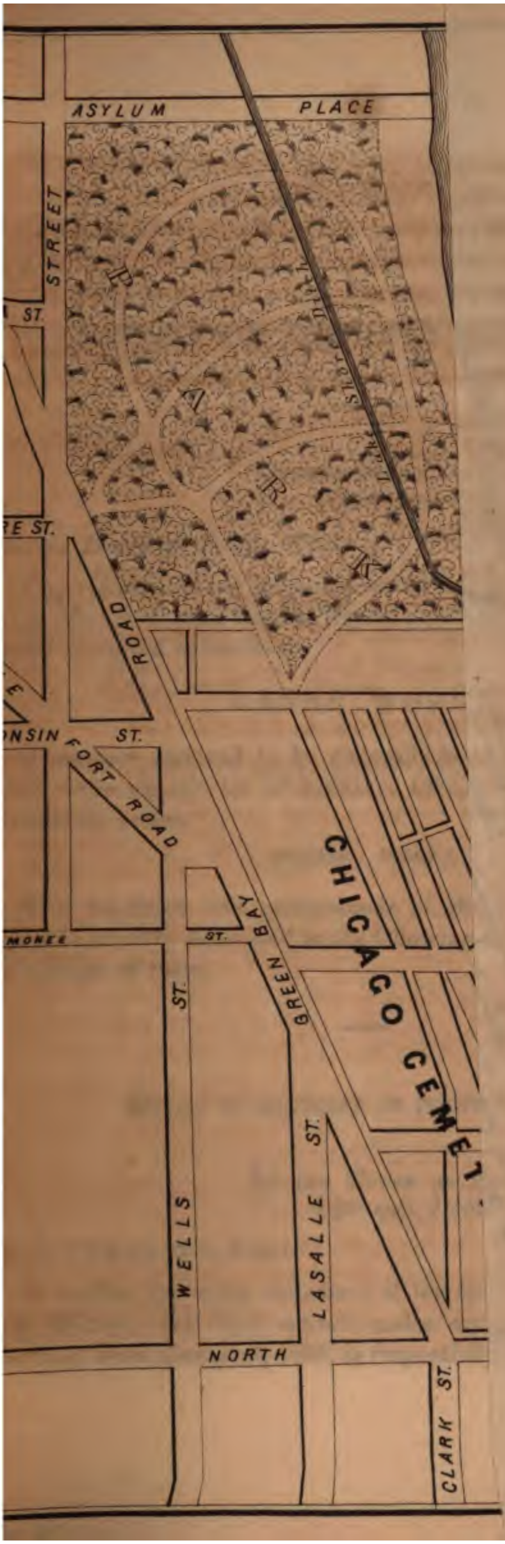
The work done in the Parks and Cemetery will be found fully exhibited in the report of the Superintendent of the Cemetery grounds and parks, submitted herewith. But little could be done for the parks, as the appropriation was very meager. We would recommend a more liberal appropriation for both these objects for the coming year. It would, doubtless, gratify the citizens to see well ornamented the small amount of public grounds which the city has. We especially recommend that liberal provision be made for laying out and improving the grounds to be used for a park at the north of the cemetery. That their location may be understood, we submit a small sketch appended herewith. It is desirable that a regular plan be determined on for ornamenting these grounds, and for drives and walks connecting with the cemetery and connecting streets, and that an annual appropriation be made to carry it out. This park will have an extent of about fifty acres.

STREET LAMPS.

It will be observed that under the provisions of the new charter, lamps erected in new districts will, hereafter, be paid for *by* special assessment on the lots along the streets to be lighted.

We respectfully invite your attention to the detailed statement of the expenditures by the Board, appended herewith.

B. CARPENTER,
F. LETZ,
J. G. GINDELE,
F. C. SHERMAN,
Board of Public Works.


ASYLUM PLACE
STREET
ST.
PARK
Ditch
RE ST.
ROAD
E
ONSIN ST.
FORT ROAD
MONEE ST.
WELLS ST.
GREEN BAY
CHICAGO CEMET
LASALLE ST.
NORTH
CLARK ST.

REPORT OF THE CITY ENGINEER.

Office Board of Public Works,
Chicago, April 1st, 1863.

he Board of Public Works :

entlemen—Your Engineer would herewith respectfully pre-
this his Second Annual Report; and in doing so, follow the
r observed in his first.

WATER WORKS.

ıese are believed to be generally in as good a condition as
were on the 1st of January, 1862, and in some respects
ledly better.

PUMPING WORKS.

ɦe condition and performance of these for the last fifteen
ths are fully described in the following report of the Engineer
ıarge of them.

REPORT OF ENGINEER OF PUMPING WORKS.

Engine House of Pumping Works,
Chicago, January 1st, 1863.

i. Chesbrough, Esq.:

ir—The following statement of the operations of the Pump-
Works, and other matters under my charge, for the year
ng December 31st, 1862, is respectfully submitted.

THE PUMPING ENGINES

Have been in operation the past year 6,152$\frac{51}{60}$ hours, being an average of nearly 17 hours each day throughout the year, during which time they have made 3,369,071 revolutions, delivering 2,217,279,739 U. S. gallons of water, being an increase over the quantity pumped in 1862, of 450,125,050 gallons. Of the whole quantity

The large engine pumped	- - 1,288,812,432	galls.
The small engine pumped -	- 928,467,307	"
Total, - - - -	- 2,217,279,739	"
Being an average daily quantity of	6,074,739	"

The coal consumed for this purpose amounts to 2,748$\frac{1211}{2000}$ tons. In addition to the above amount of coal, 138$\frac{1350}{2000}$ tons was consumed for maintaining the fires when the engines were at rest. There has also been consumed for pipe laying, work shop, heating engine house, etc., 82$\frac{1650}{2000}$ tons, making the whole amount of coal used for all purposes, 2,970$\frac{211}{2000}$ tons.

The following table will show the quantity of water pumped each month from 1858 to 1862 inclusive.

MONTHS.	1858.	1859.	1860.	1861.	1862.
January........ .	81,588,179	106,905,665	132,284,454	137,651,918	151,971,04
February........	69,426,515	106,401,412	130,800,720	142,071,067	168,931,78
March...........	82,677,463	102,415,983	150,831,680	135,576,447	192,987,94
April............	82,600,732	89,994,235	132,930,546	128,371,178	170,081,57
May	82,279,920	116,007,263	141,171,078	150,489,168	181,483,08
June............	90,211,505	113,098,416	148,197,024	155,996,852	199,118,51
July	101,670,736	133,800,836	166,894,640	147,182,798	209,215,87
August..........	107,176,652	123,266,556	152,427,690	168,602,494	195,588,29
September.......	108,534,540	131,785,847	132,272,202	152,710,186	186,902,88
October.........	101,046,605	141,527,040	148,710,195	149,862,166	199,045,04
November	86,885,840	127,842,018	150,493,243	153,879,648	187,002,7
December	98,316,722	122,658,189	130,773,075	145,261,272	175,006,02
TOTALS......	1,091,865,457	1,415,147,910	1,716,786,552	1,767,154,689	2,217,279,739

The average daily quantity pumped for the above years was

1858	2,991,412	galls.
1859	3,877,118	"
1860	4,703,525	"
1861	4,841,547	"
1862	6,074,739	"

The supply of water the past year has been uninterrupted, with two exceptions, on the 24th of April, about 4½ hours, at night, for the purpose of cleaning out the pump well, and on the 25th of September, when it was found necessary to refit one of the steam "stop valves," requiring about five hours time, also at night. In each of these cases the reservoirs were full, and watchmen were stationed at each to let on the water in the event of a fire occurring.

Neither the engines nor boilers have received any extensive repairs the past year, those of any importance being the "stop valves" alluded to above, and the repairs done to the "delivery valves" of the large engine. In addition to the above, the engines have been painted and varnished, the labor of which was done by the engineers, the general appearance of the engines being greatly improved.

The following tables show in detail the operations of the engines, boilers, etc., each month of the past year.

LARGE ENGINE.

Months.	No. of Days run.	No. of Hours run.		Av. No. of Hours run per Day.		Average galls. of Water pumped per Day.	Whole number of galls. of Water pumped.	Pounds of Coal consumed for pumping.	Pounds of Coal consumed for maintaining fires when not pumping.	Total Pounds of Coal consumed.	Number of Revolutions made.
		H.	M.	H.	M.						
February...	21	330	51	15	45	6,058,256	127.228,876	325,000	22,900	347,900	155,911
March	26	429	46	16	32	6,437,863	167,384,448	435,585	26,400	461,985	205,128
April.......	3	42	56	14	18	6,361,264	19,083,792	45,180	1,400	46,580	23,387
May.......	11	169	54	15	27	6.036,619	66,402,816	170,395	10,800	181,195	81,376
June... . .	27	455	45	16	58	6,745,328	182.123,856	502.485	24,500	526,985	228,191
July.......	31	507	43	16	23	6,748,895	209,215,872	551,590	22,050	573,640	256,392
August.....	4	69	23	17	21	7,278,620	29,094,480	71,695	2,650	74,345	35,655
October....	28	429	12	15	20	6,414,634	179,609,760	434,115	22,400	456,515	220,110
November..	30	449	15	14	58	6,233.424	157,002,720	460,565	25,400	485,965	229,170
December..	22	287	40	13	05	5,530,514	121,671,312	279,828	21,400	301,228	149,107
Totals...	203	3,172	25	15	38	6,348,829	1,288,812,432	3,276,388	179,900	3,456,288	1,579,427

SMALL ENGINE.

Months.	No. of Days run.	No. of Hours run.		Av. No. of Hours run per Day.		Average galls. of Water pumped per Day.	Whole number of galls. of Water pumped.	Pounds of Coal consumed for pumping.	Pounds of Coal consumed for maintaining fires when not pumping.	Total Pounds of Coal consumed.	Number of Revolutions made.
		H.	M.	H.	M.						
January...	31	522	59	16	52	4,902,292	151,971,047	400,700	23,800	424,500	292 928
February...	7	136	45	19	32	5,956,915	41,708,407	104,200	3,500	107,700	80,394
March......	5	86	23	17	17	5,110,699	25,553,494	60,000	2,600	62,600	49,255
April.......	27	513	39	19	01	5,592,510	150,997,778	391.010	16,100	407,110	291,052
May........	20	376	14	18	48	5,754,010	115,080,216	268,805	12,150	280,955	221,820
June........	3	54	01	18	00	5,663,220	16,989,662	40,470	1,500	41,970	32,748
August......	27	514	22	19	03	6,166,437	166,493,815	373,903	13,400	387,303	320,921
September..	30	553	55	18	28	6,230,096	186,902,888	417,055	16,100	433,155	360,260
October....	3	57	33	19	11	6,478,428	19,435,285	42,095	1,500	43,595	37,462
December..	9	164	35	18	17	6,926,079	53,334,715	122,585	6,800	129,385	102,804
Totals..	162	2,980	26	18	30	5,731,280	928,467,307	2,220,823	97,450	2,318.278	1,789,644

Recapitulation.

ENGINES.	No. of Days.	No. of Hours.		Whole number Gallons water pumped.	Pounds Coal consumed for pumping.	Pounds Coal consumed for maintaining fires when not pumping.	Total pounds of Coal consumed.	Whole number of Revolutions.
		H.	M.					
Large	208	3,172	25	1,288,812,482	3,276,388	179,900	3,456,288	1,579,427
Small...........	162	2,980	26	928,467,307	2,220,823	97,450	2,318,273	1,789,644
TOTALS.......	365	6,152	51	2,217,279,789	5,497,211	277,350	5,774,561	3,369,071
Excess of 1862 over 1861		185	07	450,125,050	867,723	44,185	911,908	715,758

APRIL 1, 1863.

The following statement will show the operation of engines, boilers, etc., for the additional three months ending March 31st, 1863.

The small engine has been in use most of the time; the large engine was started on the 17th of March, since which time the pumps of the small engine have received a thorough overhauling, most of which was done by the employes.

The north boiler has also received some small repairs, the cost of which was $64.67.

The following table shows the quantity of water pumped for the three months of

January, 1863, - - -	169,900,255	U. S. Galls.
February, " - - -	158,108,450	"
March, " - - -	159,930,404	"
Total, - - -	487,939,109	"

Average number of gallons pumped per day, - - 5,421,545

The average number of gallons pumped per day during the corresponding period of 1862, was 5,910,273. The weather in the first quarter of 1862 was very cold, while in that of 1863 it was unusually mild.

The following table will show in detail the operation of the engines, boilers, etc., for three months:

MONTHS.	Days.	Number of Hours run.		Average number of hours run per day.		Pounds of coal used for pumping.	Pounds of coal used for keeping fires when not pumping.	Total pounds Coal consumed.	No. of Revolutions made.
		H.	M.	H.	M.				
January	31	520	37	16	48	386,600	21,800	408,400	327,487
February	28	489	—	17	28	371,980	17,700	389,680	304,758
March	31	471	25	15	12	421,800	22,600	444,400	256,772
TOTALS	90	1481	02	16	43	1,180,380	62,100	1,242,480	889,017

In addition to the coal consumed for pumping, 53,970 pounds were used for pipe laying, stoves, etc., etc., making a total of $654\frac{850}{2000}$ tons consumed for all purposes, for the quarter ending March 31st.

The coal remaining on hand April 1st, amounts to $173\frac{500}{2000}$ tons.

A detailed list of property remaining at the pumping works is herewith appended.

THE WORK SHOP

Alluded to in your last Annual Report was brought into use in the month of April last.

A portion of the north coal house formerly used for a carpenter shop, was arranged with the necessary shafting, etc., for the "machine shop," a shop 16×24 was built adjoining, which is used for blacksmiths, etc. The tools employed are not of a character to admit doing all work required of them with facility, yet as you anticipated, the establishment of the shop has proved to be a source of both convenience and profit to the city.

The following will exhibit the character and value of the work turned out the past year. The valuation is the same as formerly paid for the corresponding articles, except the iron fence which is estimated.

325	feet Wrought Iron Fence, at	$5	per foot,	$1,625.00
54	New Fire Hydrants,	35	"	1,890.00
42	4 inch Stop Valves,	25	"	1,050.00
28	6 " " "	35	"	980.00
5	8 " " "	50	"	250.00
1	12 " " "	70	"	70.00
Iron Footwalk for Engine House,				239.17
Repairs done for sundry City Departments,				716.81
Total value,				$6,820.98

The expenditures for the past year were as follows:

For Shops, Tools, etc.,	$1,746.09
" Labor and material in foregoing work,	4,560.76
" Raw material on hand,	319.16
Total expenditures,	$6,626.01

The cost of labor and material in the manufacture of hydrants, fence, stop valves, etc., is	$4,560.76
Add interest on shop and tools at 8 per cent,	139.69
" for depreciation of shop and tools at 10 per cent.,	174.61
Total cost,	$4,875.06
Showing a balance in favor of the city of	$1,945.92

In addition to the raw material there is remaining on hand,

10 4 inch Stop Valves, complete.
9 6 “ “ “ “
3 8 “ “ “ “
1 12 “ “ “ “

Respectfully,

DEWITT C. CREGIER,
Engineer.

DISTRIBUTING PIPES

Have been laid to January 1, 1863, as follows, viz.:

SOUTH DIVISION.

ON WHAT STREETS.	BETWEEN WHAT STREETS.	Diameter of Pipe.	No. of ft.
Indiana Avenue......	North street, northward	6 inch.	208
Clark...............	Liberty and Archer Road	8 “	3,253
New................	Clark, eastward...................	6 “	42
Old	Clark, eastward...................	6 “	44
Old	Arnold and the River..............	4 “	829
Grove	Archer Road and South	6 “	1,136
Grove	South, northward..................	4 “	100
South	Archer Road and Grove	6 “	1,144
McGlashun	South, southward	4 “	53
Archer Road	Grove and Halsted	6 “	1,831
Archer Road	Grove & Halsted (wrought iron siphon)	9 “	90
Halsted	Archer Road and South Branch.....	4 “	450
Palo Alto	Cottage Grove and Calumet Avenues.	4 “	916
Alley rear Park Row.	Michigan Avenue and the Lake.....	4 “	336
Street east Mich. Av..	Alley rear of Park Row and Twelfth.	4 “	91
Prairie Avenue	Monterey and Buena Vista	4 “	440
Monterey	Cottage Grove and Prairie Avenues..	4 “	208
	Hydrants	4 “	255
	TOTAL	....	11,426

WEST DIVISION.

ON WHAT STREETS.	BETWEEN WHAT STREETS.	Diameter of Pipe.	No. of ft.
Rucker	Kinzie and Fourth	6 inch.	1,214
Indiana	Rucker and westward of Elizabeth..	4 "	507
Hunt	Rucker and westward........	4 "	276
Kinzie	Rucker and Elizabeth	4 "	443
Halsted	Dussold and Polk	6 "	1,969
Ewing	Halsted and eastward............	4 "	17
Taylor	Halsted and westward	6 "	393
Canal............	Meagher and Canal Port Avenue....	6 "	1,032
Mitchell	Union and Jefferson............	4 "	800
Union	Liberty and Barber	4 "	549
Union	Twelfth and southward	4 "	55
Jefferson............	Mitchell and Kramer	6 "	672
Twelfth	Halsted and Union	8 "	518
Newberry	Twelfth and Taylor............ ..	4 "	705
Kramer............	Jefferson and Halsted	4 "	1,290
Seward	Canal Port Avenue and northward..	4 "	885
Canal Port Avenue...	Canal and Seward............	6 "	307
North	Canal and Jefferson	6 "	518
Barber	Canal and Halsted	4 "	1,844
West Water.........	Cook and northward............	4 "	74
Forquer	Jefferson and Blue Island Avenue...	4 "	2,109
Dupuyster............	Desplaines and westward............	4 "	454
Paulina	Washington and southward.........	4 "	126
West Washington....	Warren and Union Park............	4 "	434
Park Avenue	Paulina and Union Park	4 "	396
Pearl............	Third and northward............	4 "	269
Prairie	Green and Halsted............	4 "	341
Polk	Rucker and Morgan	6 "	1,551
May............	Polk and Gurley............	4 "	434
Gurley............	May and Aberdeen....	4 "	150
Margaret............	Randolph and Washington	4 "	466
Rucker	Adams and Jackson............	6 "	261
West Indiana........	Union and Desplaines............	4 "	321
Taylor............	Jefferson and Halsted............	4 "	1,295
Peoria............	Randolph and Lake	4 "	255
Wright	Canal and Stewart Avenue........	4 "	548
For Dole's Elevator...	Canal and South Branch............	4 "	1,513
For Union Elevator..	Stewart Avenue and South Branch..	4 "	674
South Side Union Park	Washington and Reuben............	4 "	775
	Hydrants	4 "	331
	TOTAL............		26,271

NORTH DIVISION.

ON WHAT STREETS.	BETWEEN WHAT STREETS.	Diameter of Pipe.	No. of ft.
Dearborn	Division and Church	4 inch.	1,397
West Clybourne Ave..	Clybourne Avenue and North Branch	6 "	1,527
Church	North Avenue and Menomonee.....	4 "	2,000
Green Bay Road	Asylum and Franklin..............	4 "	1,290
Franklin	Green Bay Road and Wisconsin.....	4 "	819
Wisconsin...........	Franklin and Sedgwick	4 "	180
Southport Avenue....	W. Clybourne and Clybourne Aves...	4 "	1,345
Clybourne Avenue ...	Southport Ave. and North Reuben..	4 "	1,880
Hickory.......... ...	Green Bay Road, eastward	4 "	129
Larrabee............	North Avenue, northward..........	6 "	1,220
Willow	Larrabee and Orchard	4 "	660
Elm	Clark and Larrabee...............	4 "	417
Clark	Elm, northward	6 "	50
Asylum Place........	Green Bay Road, westward.........	6 "	30
	Hydrants	4 "	240
	TOTAL		13,184

Totals for 1862 and first quarter of 1863, 90 ft. 9 in., 3,771 ft. 8 in., 15,149 ft. 6 in., and 31,871 ft. 4 in.

The total length of pipe of different sizes *in the city*, as near as can be ascertained, is as follows, viz.:

24	inch cast iron main pipe	12,265	feet,
16	" " " " "	10,610	"
12	" " " " "	9,830	"
30	" wrought iron river pipe, State street.......	280	"
24	" " " " " Chicago avenue..	236	"
24	" " " " " Rush street.......	530	"
12	" " " " " Adams street	176	"
12	" cast iron distributing pipe	364	"
10	" " " " "	7,862	"
9	" wrought iron distributing and siphon pipe, Archer Road	90	"
8	" cast iron distributing pipe................	37,352	"
6	" " " " "	173,670	"
4	" " " " "	270,357	"
3	" " " " "	30,388	"
		554,010	"

Or, 104 miles and 4,890 feet, not including 989 feet of 4 inc pipe laid in 1862 for three different railroad companies, at the own request and cost, and mostly on their own premises.

HYDRANTS.

During the year the following new hydrants have been put i viz.:

SOUTH DIVISION.

1 Cregier, N. E. corner Clark and Springer.
1 " N. E. " Clark and North.
1 " N. E. " Clark and Old.
1 " N. E. " Clark and New.
1 " N. E. " Archer Road and Halsted.
1 " S. W. " South and Grove.
1 " N. W. " Archer Road and Grove.
1 " N. W. " South and Stewart avenue.
1 " S. W. " Cottage Grove ave. and Buena Vista
1 " N. W. " Lake and Wabash avenue.
1 " N. E. " Old and Grove.

WEST DIVISION.

1 Hamilton, N. W. cor. Rucker and Fourth.
1 " N. W. cor. Rucker and Hubbard.
1 " S. W. cor. Canal and North.
1 " N. side Mitchell, bet. Jefferson and Union.
1 " S. W. cor. Twelfth and Union.
1 " S. W. cor. Halsted and DeKoven.
1 " S. W. cor. Halsted and Forquer.
1 " Kramer, north side, east of Union street.
1 " N. W. cor. Jefferson and Kramer.
1 " N. W. cor. Canal and Canal Port avenue.
1 Cregier, N. E. cor. Polk and Aberdeen.
1 " N. E. cor. Polk and Rucker.
1 " N. E. cor. May and Gurley.
1 " N. W. cor. Taylor and Union (extended.)
1 " N. W. cor. Taylor and Desplaines.
1 " N. E. cor. Washington and Sheldon.
1 " S. E. cor. Randolph and Ada.
1 " N. W. cor. Washington and Clinton.

NORTH DIVISION.

1	New York,	W. side Dearborn, line of Goethe.
1	"	N. W. corner Dearborn and Church.
1	"	N. E. " W. Clybourne and Southport aves.
1	Hamilton,	W. side Church, bet. North ave. and Linden.
1	Cregier,	W. side Church, bet. Linden and Menomonee.
1	"	W. side Church, bet. Menomonee and Wisconsin.
1	"	N. W. corner Franklin and Center.
1	"	N. W. " Green Bay Road and Sophia.
1	"	N. W. " Larrabee and Willow.
1	"	S. W. " Clybourne ave. and North Reuben.
1	"	N. W. " Green Bay Road and Asylum Place.

In all, 40. The total number in the city, as reported Jan. 1, 1862, was 469; but as the one at the N. W. cor. of Wilson st. and Stewart avenue was taken out and discontinued in 1862, *the total number* in the city, at this time, is 508, not including 9 put in for railroad and gas companies, on their own premises, and at their own cost.

Twenty-one hydrants were taken out and renewed—2 by Hamilton's, and 19 by Cregier's. Besides these, 45 hydrants received more or less repairs.

It will be seen from the foregoing that of the hydrants now established in this city, 45 are Cregier's. While no particular merit is claimed for the working part of this hydrant over that of several other kinds, it, however, possesses in its supplementary valve a most decided advantage over others, especially in a city like ours, where the stop-cock districts are so large. By closing the supplementary valve, the upper or working part of the hydrant can be taken out for repairs or renewals, without depriving any one in the district of water for a moment.

In consequence of the scarcity of good masons and laborers last year, and the urgent necessity of doing other kinds of work, much less was done than should have been in connecting the hydrants by means of drains with the sewers.

STOP-COCKS.

The following stop-cocks have been put in during the year:

SOUTH DIVISION.

1 New York 4 in., Indiana av. at C., B. & Q. R. R. round-house.
1 W. Wks. shop 4 in., Tremont House alley, for Tremont House.
1 " 8 in., Clark, south side of North.
1 " 6 in., " " " " Cross.
1 " 4 in., " " " " Old.
1 " 4 in., " " " " New.
1 " 4 in., McGlashun, south side of South.
1 " 6 in., Grove, " " " "
1 " 6 in., E. side Ogden's slip on Archer Rd.
1 " 6 in., W. " " " " "
1 " 4 in., W. " " " " " Blow-off.
1 W. Wks. shop 4 in., Tremont alley, bet. Franklin and Wells, Blow-off.
1 W. Wks. shop 4 in., Tremont alley, bet. Franklin and Market, Blow-off.
1 W. Wks. shop 4 in., Quincy, bet. Clark and State, Blow-off.
1 " 4 in., Prairie avenue and Monterey.
1 " 4 in., Arnold and North.

WEST DIVISION.

1 W. Wks. shop 4 in., Halsted, south side of Twelfth.
1 " 4 in., Forquer, west side of Halsted.
1 " 6 in., Taylor, west side of Halsted.
1 " 6 in., Halsted, south side of Polk.
1 " 4 in., Union, south side of Twelfth.
1 " 4 in., Prairie, west side of Halsted.
1 " 6 in., Rucker, south side of Adams.
1 " 4 in., Canal, south side of Monroe, for P. & Ft. W. R. R. Co.
1 W. Wks. shop 4 in., Peoria, north side of Randolph.
1 " 4 in., E. side of Canal, bet. North and Meagher.

NORTH DIVISION.

1 New York 4 in., Chicago av., at Lill & Diversey's Brewery.
1 W. Wks. shop 4 in., W. Clybourne av., at Wicker's Distillery.
1 " 4 in., Church, north side of North avenue.
1 " 4 in., Franklin, north side of Center.
1 " 4 in., Southport av., north side of W. Clybourne avenue.
1 W. Wks. shop 6 in., Larrabee, north side of North avenue.

In all, 32; and, together with those previously put in, making a total of 253 in the city.

Nine stop-cocks were repaired, and 27 were entirely renewed by others made at the Water Works shop, making the total number of stop-cocks made at our own shop, and in actual use on the 1st day of April, 1863, 57 — of which 2 are 8 in., 17 are 6 in., and 38 are 4 in.

WORK SHOP.

The benefits of the work shop have been fully as great as were anticipated at the date of the last Annual Report. The work is not only done when it is wanted, and in the best manner, but an actual saving has been effected in its cost, fully sufficient to justify the outlay made in fitting up. The details will be found in Mr. Cregier's report above.

RESERVOIRS.

During the year 1862 the three reservoirs were all in uninterrupted use, except for about a day with each, when it was necessary to cleanse them.

The south reservoir continued to leak so much as to render further repairs necessary. These repairs have been made for a short time, and appear to be effectual. They consist in five coatings of roofing composition, and four of felting, on the bottom of the reservoir. Over this a layer of three inches of concrete was carefully placed. The bottom of the reservoir was thoroughly keyed up on the beams and other supports. Of course it is too soon yet to judge of the durability of these repairs, but their success so far is very encouraging.

The north reservoir is in very good order. The west one leaks more than it did a year ago, but not sufficient to do any injury yet; it should, however, be calked in the spring.

A few hundred dollars expended in improving the grounds around these reservoirs would add very much to their external appearance.

QUALITY OF THE WATER.

The quality of the water has been bad several times since the date of the last report. At the breaking up of the ice last spring, the discharge from the river was accompanied by a southerly wind, and was carried in front of the pumping works. The taste of the water for several days was exceedingly disagreeable. During the summer, complaints of bad water were comparatively few. In the autumn, soon after the packing season commenced, the offensive state of the river returned, and the water supplied to the city was evidently affected by it during protracted southerly winds. Since the Calumet feeder has been discharged into the canal, and thence into the South Branch, the river has been far less offensive than before, and complaints of bad water have been rare. Perhaps this exemption from annoyance for so long a time has been owing more to the great amount of rain and melted snow discharged into the branches of the river than to any other cause.

The "*fish nuisance*" has been entirely abated since December, by means of the new inlet house, constructed for that purpose. By constantly watching, and daily cleansing the screens in this house, it is believed we may continue to enjoy exemption from what was so offensive a year ago. There is no diminution of the fish, however, outside of the screens; for they appear sometimes to be more numerous than ever.

PLANS FOR GETTING BETTER WATER.

The evil with regard to the water has become such as to demand some remedy, as soon as an adequate one can be applied. The various schemes that have been proposed to effect this object having been discussed in previous reports, it is not thought necessary to go into detail now concerning any of them, except those which are to take the water from about two miles east of the pumping works, where the lake is supposed never to be affected by impurities from the river; or from a point about five miles northward on the lake shore, where impurities from the river very rarely have any perceptible influence.

Other projects, such as erecting new pumping works at Winnetka, or going to Crystal Lake and bringing a supply thence by simple gravitation, as is done for the cities of New York, Boston, Baltimore, and Albany, have been considered, but their great cost, as compared with that of obtaining an abundant supply of good and wholesome water at points much nearer the city, is deemed a sufficient apology for not discussing their details here.

The cost of iron pipes alone to Winnetka, according to the estimate on page 34 of the report of the late Water Commissioners, dated Jan. 1, 1861, would be $1,689,600; but if the present high prices of iron should continue, this amount would be insufficient.

The cost of iron pipes to Crystal Lake, supposing the size the same as proposed to Winnetka, three feet diameter, would be upwards of $5,000,000. Suppose, however, by expending $500,000 at present for a reservoir that might be sufficient for a few years, the second line of pipe might be omitted for eight or ten years, there would remain the necessity for a present expenditure of more than $3,000,000 for items that do not include land and water rights, and the expensive excavation that would be necessary in getting out of the basin of the lake. At the end of a few years, probably not more than ten, the second line of pipe would be necessary, involving an expenditure of nearly $3,000,000 more.

Of the plans proposed for obtaining water from the lake, where it will be free from not only the wash of the shore, but from the effects of the river, two classes only have been considered: one, an *iron pipe with flexible joints;* and the other, *a tunnel under the bottom of the lake.* A great many suggestions have been made with regard to the kind of iron pipe that should be adopted, and the mode of laying it; but the one considered and estimated upon in the report of the late Water Commissioners, for January 1, 1861,—see pp. 26 to 32—may be regarded as a type of the whole, at least as economical as any. In the report mentioned, the suggestion was to extend a pipe but one mile into the lake; but observations made last winter and spring show that the water for the city should be taken from a point *two* miles out; because the bad taste was found at one time to extend about a mile from the shore, and therefore to be out of the reach of danger, a point two miles out should be attained.

It should be here stated that actual observations since 1861, show that the following opinion expressed in the report for the 1st of January of that year, was not correct: "Impurities from the river would be more likely to affect the water a mile out from the pumping station than near the shore, because the prevailing winds are from the north-east, and the currents of this side of the lake strongly southward, as the character of the newly formed beach north of the pier shows." I was led into this error by a study of the formation of the beaches and bars in front of the city. Since, however, there has been an opportunity of studying the offensive discharges from the river as they occurred about a year ago, on so large a scale, it has been ascertained that they mingle so completely with the lake as to be scarcely traceable a mile out, and are carried northward or southward, parallel with the shore, according to the direction of the wind or current in the lake. Generally, discharges from the river are accompanied by southerly winds, and consequently by a northerly current in the lake. The winds and currents, however, are not always in the same direction, as was noticed by some of the earliest French missionaries to this part of the country, much to their surprise.

Estimating then for a pipe two miles long, and allowing for the different items the present prices for materials and labor, the cost would probably be as follows:

10,560 lineal feet of pipe, weight 184 lbs. per foot, or 1,943,040 lbs., at 10 cents,	$194,304
10 joints at $300,	3,000
Bulkhead,	2,250
Laying the pipe,	15,000
	$214,554

Thus far the items are those of the gentleman who proposed the pipe, except that the prices have been changed to suit the present state of things, and the length of the pipe doubled, for reasons already given. For reasons mentioned in the report for January 1, 1861, a liberal addition should be made to the above estimate for unforseen contingencies, so that if it should be increased to $250,000, it might then be considered moderate. In consequence of the possibility of such a pipe being injured, by anchors, by the sinking of a heavily loaded vessel over it, or by the effect of an unusual current in the lake moving it from its place, it has been thought preferable to attempt the construction of a tunnel under the bottom of the lake.

LAKE TUNNEL.

The subject of tunneling under the lake to a point two miles out, has received much consideration from the fact that it would not only furnish equally as good water as the pipe would, but could probably be more easily made, considering the circumstances, than is generally supposed.

It is known from artesian borings on the lake shore, at Lill & Diversey's brewery, that about 20 feet below the surface, a clay formation commences which continues upwards of 100 feet further. The bottom of the lake, where the water is more than 25 feet deep, is clay. Should this clay be continuous, and free from beds of sand, it would be very easy to make a tunnel large enough to supply the city for many years.

In order to make such a tunnel, it would be necessary to sink several shafts in the lake. The probability is that four would be sufficient to insure the completion of the work in two years from the time of its commencement. It is proposed to do this by sinking octagonal cribs 80 feet in diameter, with central spaces 30 feet in diameter, leaving an average of 25 feet thickness to the crib around the shaft. In the central space, protected by the crib from the action of the waves, it is proposed to sink iron cylinders 9 feet in diameter, by the pneumatic process which has been so successfully practiced in driving the hollow cast iron piles or piers for the Theiss bridge in Hungary, and the railroad bridge across the Savannah river, near Savannah, in this country, and recently the Harlem bridge in New York. The outmost shaft would be constructed with reference to its becoming the inlet for the water or gate chamber, and perhaps be surmounted with a small light house. The other shafts might either be surmounted with light houses, or be removed, together with their surrounding cribs, to such a depth as not to interfere with navigation. They could be constructed with reference to such a removal, and to a restoration, should future necessities require it.

Such being the outline of the tunnel project, before entering into its details, it may be well to consider some of the objections that naturally arise on the first presentation of the subject. Those who have become at all acquainted with works of this kind, at once think of the Thames tunnel, of the appalling difficulties encountered, and the enormous expense incurred in its construction. A careful study, however, of certain well known facts in relation to that extraordinary work, will furnish us with much more encouragement than would at first be supposed. That tunnel required an excavation 38 feet wide, perfectly flat on top, through an unusually treacherous soil, and only about 14 feet below the bottom of the river, which at high tide was about 32 feet deep, while ours would require an excavation but 6½ to 7 feet, circular in form, through a soil much more favorable, as we have strong reason to believe, and at a depth of 10, 20, 30 or more feet below the bottom of the lake as may be found advisable after sinking the shafts and making experimental drifts. Each running foot of the Thames tunnel cost an average of a little less than $1,900. The sectional area of the Thames tunnel, including masonry and excavation, is about twenty-three times as large as a 5 foot one here would be. As experience shows that small tunnels in troublesome earthy soils do not generally cost any more in proportion to their sectional areas than large ones, if as much, ours estimated on the basis of the Thames tunnel ought not to cost more than $83 a running foot, or for two miles, $876,480, a sum which certainly would not appear unreasonably large, provided an equally good supply could not be got for much less.

Previous to the commencement of the present Thames tunnel, an experimental drift 5 feet high, 3 feet wide on the bottom, and 2½ feet on top, was excavated 1,000 feet in length in the same locality, under the river, and was carried forward from 4 to 10 feet a day by one digger only. It was not made entirely across the river, in consequence of the immense quantity of water that came in at the point where they stopped. The formation of the bed of the river there is composed of eight different layers of sand, gravel, mud, clay, shells, etc., the layers of sand and gravel predominating in depth. If, as we have every reason to believe, the clay formation here would shield us from such inroads of water as were met with in the Thames tunnel operations, and we take the results of the trial drift there for a guide, a tunnel 5 feet in diameter and two miles long could be constructed for less than $300,000.

Another objection which presents itself to the construction of a tunnel here, is the difficulty to be met with in the sinking and maintaining of the cribs, and consequently of constructing and preserving in working order the shafts in the lake. This objection, if past experience here with regard to lake operations for the Water Works is taken as a guide, is by no means a trifling one. The unsuccessful attempts heretofore to sink and put into place a short piece of pipe on the lake shore, have a very discouraging effect when it is proposed to attempt the same thing on a much larger and more difficult scale. But as the question now is relative to the sinking and maintaining of the proposed cribs, we must look to other sources than our own for experience and instruction. Fortunately, there is a large amount near at hand. The extensive operations of the national government in the construction of piers and breakwaters on the lakes, as described in the reports of Col. J. D. Graham, and the miles of breakwater constructed and maintained by the Illinois Central Railroad Company along our city front, furnish us with very satisfactory evidence that such structures can be erected and maintained along our lake shore, and at known prices. The opinion of experienced men is that a circular crib with nearly perpendicular sides and a base sufficiently large, could be made to stand more easily out in deep water than in shallow water near the shore. The reason for this is very plain, as one or two well known facts will show. In deep water, while the form of the wave moves in the direction the wind started it, the water itself has no motion except up and down, as may be seen by the movements of vessels and aquatic birds on the waves; but as you approach the shore or shallow water, not only the forms of the waves, but the water itself has a forward motion, the shallower the more rapid; hence the great danger of a vessel approaching too near such places in stormy weather.

It is proposed to construct the cribs in still water, plank their bottoms and sides, water-tight, for several feet up, fill them with as much stone as they can safely carry, then tow them when the surface of the lake is quiet to their places and sink them, by letting water into their bottoms, and then to fill them up, as promptly as possible, to their tops with stones previously provided.

The pneumatic process for sinking the shafts is recommended, because it is believed the operation could thus be more certainly performed, and troublesome leakage more easily avoided, than by constructing coffer-dams inside of the cribs. But by either process the end could no doubt be attained if, as soundings already show, the bottom of the lake is [hard] clay.

A diameter of only 5 feet has been suggested for the tunnel, partly to make it in capacity just equal to the proposed flexible pipe, and partly to avoid the risks and uncertainties attending the construction of larger tunnels in troublesome earthy soils. This latter point cannot be better illustrated than by quoting the language of M. Minard in his work on construction. After speaking of the great difficulties met with in constructing several large tunnels, and pointing out the methods by which they were overcome, M. Minard says (pp. 284, 285):

"The success of the general processes just pointed out, principally the lateral drift, is based, I repeat, upon the great difference there is between making a drift 4¼ feet or 4⅞ feet in width and opening a tunnel of several yards; numerous experiments prove this difference."

"In the clay of Vaurigard, drifts were made which stood well so long as they had a width of not more than 4¼ feet."

"When the small feeder tunnel of Torcy was commenced in detached masses of sandstone of moderate size, it was very easy to give it a width of 5¼ feet, but when the attempt was made to increase this width to 8¼ feet, masses were detached, the supports bent and broke, and caves extending 65 to 80 feet occurred."

"In the chalk, full of fissures, at Saint Quentin, drifts 4⅝ feet were easily excavated, without supports, where it was impossible to give them a width of 10 feet."

"In the clay of Roubaix, a number of drifts were made, 6½ feet in width; but this dimension could be exceeded but slightly without exposure to serious accidents."

In estimating the probable cost of such a tunnel various items must be assumed, for the prices of labor and materials are seldom the same exactly during two consecutive seasons, in fact they often change materially in one. The character of the soil through which the tunnel is to be made, as it regards the difficulties to be overcome, can only be fully ascertained by the actual carrying out of the work, though much may no doubt be ascertained by preliminary borings.

There is good reason to believe that nothing in the soil here would be more difficult than that through which the sewers of London are sometimes tunneled. M. Bazalgette, the Engineer of the Metropolitan Board of Works, in 1856, estimated the excavation of tunnels for sewers to cost on an average, including all expenses of raising the earth to the surface and carting away the surplus, supporting the top and sides till the masonry was built, and restoring water and gas pipes and paving, at three English shillings, or say 75 cents, a cubic yard. The same year he estimated for several much larger tunnels in the same city at twice the rate, or say $1.50 per cubic yard. These estimates are based upon the actual experience of a city which has probably had more to do with this kind of work than any other city in the world. But, to allow for our extra hauling underground, the proposed average in the tunnel being an eighth of a mile, and taking into account the difference of prices in the two countries, the cost per cubic yard for our tunnel will be estimated at $3.

The cost for brick masonry per cubic yard, in the English sewer tunnels appears to average from $5.58 to $6.75. In the tunnels on the Boston Water Works it averaged $14.57. In the estimated cost of 1861 for the proposed tunnel here, $15 per cubic yard was allowed for this item; but as that was for a 6 foot opening, with 12 inches in thickness of masonry around it, and this is only 5 feet opening with 8 inches of masonry around, and as prices of labor and materials may continue high, $20 per cubic yard will be allowed in the present estimate.

The next item to be considered is the cribs. It is evident that an octagonal crib 80 feet in outside diameter, with a central space of 30 feet, leaving the solid portion 25 feet thick, would be very much stronger, and better calculated to resist the action of storms, than cribs of the same width and construction placed in a straight line; but it is proposed to construct ours in the same manner as those of the government.

Col. Graham estimated the cost of a crib 30 feet long, 30 feet wide, and 32 feet high, (for the proposed breakwater at Michigan City,) p. 352 of his report for 1856, as follows, viz.:

"For 6,210 lineal feet of white oak timber, hewn, one foot square, at 22 cents per lineal foot, - -	$1,366.20
"For 2,160 feet, board measure, of white oak plank, 3 inches thick, for flooring, at $20 per M, - - -	43.20
"For 8,060 pounds of round wrought iron, for bolts, $1\frac{1}{2}$ inches diameter, at 4 cents per pound, - -	322.40
"For 164 pounds of wrought iron spikes, $\frac{5}{8}$ by $\frac{5}{8}$ inches square, pointed and headed, at $7\frac{1}{2}$ cents per pound,	12.30
"For 176 cords of hard boulder stone, for crib ballast, at $10 per cord, - - - - - -	1,760.00
"Estimated cost of materials for one crib, - -	$3,504.10
"For carpentry, labor, superintendence, etc., - -	1,250.00
"Add 10 per cent. for contingencies, - - -	475.40
"Estimated cost of one crib, - - - - -	$5,229.50"

Which, for 28,800 cubic feet, would be $18\frac{16}{100}$ cents, very nearly, per cubic foot.

By examining Col. Graham's prices, it will be seen that they are for all the important items, quite equal to those of the present day; but for safety about 21 per cent. will be added to all his prices, making the estimated cost 22 cents per cubic foot.

The shafts come next in order. These it is proposed to make of air-tight wrought or cast iron cylinders, jointed together in sections of 6 to 10 feet, and 9 feet in diameter. They are to be sunk by the pneumatic process, which consists in exhausting the air from them to sink them, and in compressing the air sufficiently within them afterwards to force the water entirely out of them through syphons, thus allowing excavation and other kinds of work to be performed in them. It would of course require a small steam engine, air pumps and chambers, pipes, valves and other kinds of apparatus, to perform the process, all of which will be found described, with accompanying drawings, in the July, August, September and October numbers of the *Journal of the Franklin Institute*, in an article from the French of M. Cezanne, translated by Jos. Bennett. An examination of this article suggests but one item of more than ordinary expense, and that is the slowness with which such a cylinder sinks in clay; but this would require only an increased expenditure of steam power, a small matter compared with the whole expense of the shaft; while on the other hand the freedom from tidal and river currents we should have, and the spacious and solid platform the cribs would afford for the different operations, would be of great advantage; while the very slowness with which the cylinder would descend into the clay, would make it so much the easier to keep it plumb, a serious difficulty sometimes encountered in loose sand.

The estimate for the cylinders will be for cast iron, 9 feet in diameter, and 1½ inches thick, although wrought iron of sufficient strength could probably be made for less. The cylinders, including flanges, would weigh 1,650 pounds per lineal foot, for which, delivered and put together on the cribs, 6 cents per pound is believed to be ample. This would be $99—say $100 per foot.

The cost of apparatus for sinking at the Theiss bridge, was $5,640; for ours, it will be called $10,000. The cost of filling the twelve cylinders of that bridge with beton (concrete), was $8,132. This operation required important expenditures, which we should not need here for the sinking of our cylinders, but it also left out some others. For the sinking of our cylinders, $10,000 will be allowed—that is, $2,500 for each, while the above statement for the Theiss bridge makes only $761 each. These appear to have been sunk upwards of 20 feet.*

According to the new city charter, it would be necessary to furnish and maintain beacon lights at the piles or cribs. There are several strong reasons why it would be better to remove the cribs and shafts after the completion of the tunnel to a depth sufficient to avoid all dangers to navigation. These are:

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* Since the date of this report, a visit has been made to the Harlem bridge, on Third Avenue, New York. The iron piles of this bridge are mostly 6 feet in diameter. Four of them are 8 feet in diameter. The greatest depth of the river there at high tide is 28 feet. The greatest depth to which any pile was sunk, was 35 feet. The soil at the bottom was generally mud, but layers of very hard gravel and earth, requiring the use of picks and bars, were met with. They found some boulders a cubic yard in size, and in one case went through the wreck of a sunken canal boat. The tide produced a very rapid and troublesome current. The result of their experience shows that our estimates are abundantly large.

1st. The saving of the cost of construction and maintaining the light houses.

2nd. The avoidance of questions of damages between the city and owners of vessels or cargoes, should any be lost or injured by coming in contact with the light houses or cribs.

3rd. Avoiding the possibility of injury to the shafts from the shock of large masses of ice. This is looked upon as imaginary by most persons, but it seems possible.

In case it should be deemed best to build one or more light houses, an additional sum must be added to the estimate for them. One light house at the outmost shaft would possess the advantage of enabling the city, by means of one or more inlet gates, to shut off the water from the tunnel at any time, either for the purpose of repairing or cleansing it. If the work should be properly done, no repairs would be needed for hundreds of years; and the comparatively short time in the year when there is any turbidity in the water of the lake two miles out, would render the necessity of entering the tunnel to cleanse it, of exceedingly rare occurrence. It is possible that the growth of shell fish and aquatic plants might obstruct it seriously after a good many years. Should such a necessity as this or any other arise for entering the tunnel, it is very easy to devise mechanical expedients, which, if provided for in the first construction of the work, could readily be used for shutting off the water.

The estimated cost of the lake tunnel would be, leaving out the light houses:

16,000 cub. yards excavation, at $3 per yard,	$48,000
4,750 cub. yards masonry, (including landshaft) at $20,	95,000
561,600 cub. feet of cribs,.at $22,	123,552
Cylinders 210 lineal feet, and apparatus for and sinking of shafts,	41,000
	$307,552

It will be seen in the above estimate that the probable cost of the masonry and excavation in the proposed lake tunnel is $143,000, or $13.54 per lineal foot. This amount will no doubt strike many as being very low, notwithstanding what has already been said about the prices per cubic yard for this kind of work.

Perhaps, to such persons, the large amount of very valuable information obtained by the commissioners upon the Troy and Greenfield Railroad, and the Hoosac tunnel, and published in their report of February 28, 1863, may afford some assurance. The commissioners, for the purpose of better enabling them to perform their duties relative to the Hoosac tunnel, sent Mr. Charles S. Storrow, so well known in the East for his high qualifications for such a mission, to Europe, to obtain by personal examination or otherwise, all the information he could, having any important bearing on the subjects they were to report upon.

The Hoosac tunnel being designed for a railroad, of course Mr. Storrow paid no attention to such as were intended for a purpose like ours, and especially to those of so small a size. Nevertheless, the information he did obtain relative to tunnels constructed through earthy, and in some cases very difficult soils, will, when the rule of proportional sectional areas, (or rate per cubic yard, including both excavation and masonry) is applied, show that our estimate of cost exceeds by a large per centage, the actual cost of the most expensive tunnel he mentions; as the following tabular statement, compiled from Storrow's report and Minard's work, will show:

NAMES.	Length in feet.	Greatest width in feet.	Cost per lin. foot in dollars and cents.	Character of Soil.	Estimated cost per lin. foot of a five foot tunnel, at same rate per cubic yard.
FROM STORROW.					
Lindal, England.....	1,689	12	$ 25.88¼	Rock and loose material.	$4.49
Sydenham, England..........	6,300	24.50	200.00	London clay	8.33
Chezy, France...............	1,388	24.27	139.00	Sand and clay............	5.90
Foug, "	3,681	24.27	83.33	Oxford clay..............	3.54
St. Cloud, France...........	1,653	24.27	133.00	Marl, clay and gypsum...	5.65
Hardelot, "	608	25	106.67	Clay.	4.27
Belleville, "	3,690	24.92	64.00	Clay and plaster.	2.57
Charonne, "	3,348	24.92	67.00	Wet clay and plaster.	2.69
Alouette, "	4,050	25.58	101 67	Clay.....................	3.89
Boubard, "	1,920	25.91	121.67	Clay and limestone.......	4.52
Poitiers, "	1,050	26.24	76.67	Lime, sand and clay......	2.78
Boissy, "	2,619	25 68	173.00	Clay and marl	6.56
Conches, "	831	25	68.00	Clay and sand	2.72
St. Louis, "	1,560	26.24	94.67	Clay.....................	3.44
FROM MINARD.					
Riqueval, France	18,620	26.27	42.67	Chalk, much water.......	1.55
Tronquoy, "	3,619	26.27	46.93	Chalk, dry.	1.70
Noirieu, "	39,372	4.92	4.27	Chalk, water.............	4.41
Thames and Medway, England.	11,877	29.53	48.77	Chalk, water.	1.40
Soussey, France	11,552	8.55	14.02	Marl, little water.........	6.15
Charleroy, "	4,226	14.11	75.59	Running sand, water.	9.50
Kilsby, England.........	7,231	23.95	207.86	Earth, sand, much water.	9.06
Cumptich, France	3,035	14.11	51.81	Sand and clay, water.....	6.57

It should be here mentioned that as the exact sectional area of very few of the tunnels above mentioned is given, the deduction as to estimated cost of a 5 foot tunnel, in the last column, was obtained by considering the greatest interior or clear width as the diameter of a circle, and considering the lining of each tunnel, whatever it might be, proportional to the diameter. These assumptions are known to be not strictly true, nevertheless the results obtained are sufficiently accurate to show that actual experience justifies our estimates.

It will be seen by examining the tables that of the twenty tunnels mentioned by Mr. Storrow and M. Minard, which include all that have any similarity of soil to ours, only three exceeded in cost one-half the estimate for ours, and that the cost of the greatest, the Charleroy, was only seventy-one per cent. of our estimate. They were all constructed through a much more difficult soil than we expect to meet with. Mr. Storrow relates some very interesting facts with regard to the London clay met with in the Sydenham tunnel. It has the peculiar property of slowly swelling after it has been exposed to the air, so that the linings of shafts were very much compressed and the invert of the main tunnel had, in some instances, to be rebuilt several times, until at last they had to make the whole lining of the tunnel, including the invert at the troublesome places, nearly or quite circular. Notwithstanding all these difficulties, the average contract price in England for tunneling through London clay is 25 per cent. less than that given in the tabular statement.

LAKE SHORE PROJECTS.

To avoid some of the objections made to the proposed lake tunnel, as well as to the pipe, it has been proposed to bring water from a point on the lake shore about five miles north of the pumping works, where there is a beach admirably adapted for the purposes of a natural filter.

At this point it is believed impurities from the river would very seldom affect the water, and then but slightly compared with our present experience. It has been thought too, that by having a natural filter basin there, 3,000 feet long and 10 feet deep at low water, all the water for the city might be delivered at all times free from sediment, and from unpleasant taste, except upon the rarest occasions. All the light we can obtain, however, from the experience of the Hamilton water works and from several in Europe, shows that natural filters are uncertain in their results and cannot be relied upon to furnish very large amounts unless they are made enormously long. Even then they are liable after a while to lose their efficiency. Dupuit, in his work on the distribution of water, 1854, p. 24, says, "By excavating galleries along certain water courses, a perfectly limpid water has been obtained, from filtration through the beds in contact with these galleries. Now it has happened that some of these have dried up, while the product of others has not diminished, hence some uncertainty with regard to the use of natural filters, and various explanations relative to the phenomenon of filtration."

Should such a filtering basin as the one here proposed fail to filter water enough for the city, as there is much reason to apprehend, it would, nevertheless, be of great service as a subsiding reservoir, by freeing the water from the grosser particles of sand and clay mixed with it along the shore of the lake in rough weather.

Three modes of conveying the water from the filtering basin to the present works present themselves. The *first*, to pump it up about 15 feet into a small reservoir, and then convey it in a brick aqueduct along the swale between the Lake View House and the cemetery, and thence along the lake shore. The *second*, to make a brick aqueduct low enough to avoid the necessity of pumping at the filtering basin, and to follow the same route as the first, making of course a much deeper excavation; and the *third*, a brick aqueduct as low as the second, but following a route sufficiently far west of the others to admit of a tunnel being made in clay. The *first* of these would undoubtedly be the cheapest in cost of construction, but would be encumbered with the constant and increasing expense of pumping, and would be liable to the objection of passing through the cemetery. The *second* would avoid the necessity of pumping, but not the objection of passing through the cemetery. The *third* would avoid both of these objections.

For the sake of comparison with the pipe and the lake tunnel plans, the estimate for these different modes will be based upon an aqueduct 5 feet in diameter and 8 inches thick, although should either of them be adopted, it is probable an aqueduct of greater size would be constructed.

FIRST MODE.

180,000 cub. yards excavation for filtering basin, at 25 cts.	$45,000
100 acres of land for filtering basin, at $250,	25,000
Inlet to basin and gate house,	15,000
67,320 cub. yards excavation, at 40 cts.,	26,928
9,025 cub. yards masonry, at $12,	108,300
Small reservoir, say	10,000
Land damages, say	10,000
Engines, pump house and fixtures,	25,000
	$265,228

SECOND MODE.

Filtering basin, inlet and gate house,	$85,000
134,640 cub. yards excavation, at 62½ cts.,	84,150
9,025 cub. yards masonry, at $13,	117,125
Land damages, say	10,000
	$296,275

THIRD MODE.

Filtering basin, inlet and gate house,	$85,000
34,700 cub. yards excavation, at $2,	69,400
9,525 cub. yards masonry, at $15,	143,175
Land damages, the line being mostly in highways,	3,000
	$300,575

It will thus be seen that of the three modes proposed for bringing the water along the lake shore, from a point north of the Lake View House, the first mentioned would cost least to construct; but on the supposition that the time would soon arrive when it would cost $5,000 a year to maintain the pumping works there, the first would be more costly than the others, for a constant annual expenditure of $5,000 would be equivalent at 7 per cent. to a permanent investment of $71,428.57; or, at 6 per cent. to $83,333.33. The probability is, that in a few years, Chicago will be able to borrow money at 6 per cent. as easily as the eastern cities do now.

The estimates for the second and third modes amount to so nearly the same, that the difference between them is very unimportant. By the third, passing through the cemetery would be avoided, as well as possibly considerable trouble in settling land damages; besides, the uncertainty as to cost and difficulty from the great quantity of water which will undoubtedly be met with on the second, would probably be much less on the third. On this account, the estimate for the third mode will be used in comparing the different plans proposed.

These plans, and their corresponding estimates, are:

1.	The flexible pipe, two miles out,	$250,000
2.	The tunnel, two miles out, without light houses,	307,552
3.	Lake shore plan,	300,575

If any allowance be made for light houses, the lake tunnel plan will probably be the most expensive, by not less than $50,000.

As the uncertainty with regard to the permanent security of the flexible pipe would be so much greater than that of the tunnel, supposing all the difficulties in placing it in its proper position were overcome, the question for decision will be considered as resting between the lake tunnel and the lake shore plan.

The advantages of the lake tunnel plan are the supply of a much superior quality of water during a considerable portion of the year, and, with the same head, a larger quantity; in other words, the lake tunnel would be capable of delivering into the pumping well, at a level of 2, 8, or 18 feet below the level of the lake, as much water as an aqueduct on the lake shore, of the length proposed, 10 inches larger in diameter, would. The quantities delivered under these different heads would be, respectively, 19,000,000, 38,000,000, and 57,000,000 wine gallons daily.

The advantages of the lake shore plan are, fewer difficulties and uncertainties in the construction and cost of the work, and greater certainty in making repairs and cleansing, should these become necessary. Ought these advantages to outweigh those of the lake tunnel plan? This is a perplexing question. The more it is studied, the more does the feasibility as well as superiority of the lake tunnel plan appear settled to me; but the subject is not free from serious doubts, at least to most minds, and *it is therefore recommended that you invite proposals from respon-*

sible parties for the construction of the work on both plans, and then with the new light thus obtained, decide which to adopt.

THE CONDITION OF THE RIVER.

As the condition of the river has had much to do with the character of the water delivered through the distributing pipes of our city, it may be as proper to speak of it here, as under the head of sewerage; at least so far as that condition and the proposed remedies for it affect the water question.

The experience of the last year has not changed the views previously entertained with regard to the causes of the offensive state of the river during a protracted rainless season, whether in winter or summer; but it has proved the necessity for adopting early and decisive measures for securing permanent exemption from the evils complained of at different times during the last two years.

Last spring the Board employed Dr. Mariner, Assayist of this city, to ascertain if possible the causes of the black appearance of the river about that time. He investigated the subject and reported thereon; but unfortunately his report has been mislaid, and, strange to say, the copy he kept for himself cannot be found. From the best of his and our recollection, his conclusions generally did not differ from those entertained by the Board, as to the sources of impurity in the river; that is, that the sewers, distilleries, slaughter houses, glue factories, etc., etc., *combined*, cause it; and gave as his opinion that the black color of the river proceeded more from the sewer leading from the gas works, than from any other source.

Dr. Mahla, the well known chemist of this city, was employed afterwards by the City Council for a similar purpose. His report has been published in full, in the proceedings of the city council for September 22, 1862, but as in that form it is accessible to very few, his conclusions, the result of his careful and scientific investigations, will be repeated here.

"Thus it appears that the largest portion of the river nuisances is generated on the North Branch, and it must be borne in mind that *not a single sewer* empties into that part of the river.

"It cannot be disguised, however, that the sewers themselves give rise to a certain portion of odorous effluvia, and will do this in a still greater measure in the course of time (a thing which was mentioned in the Sewerage Commissioners' report of 1855). But considering that the sewers, which are of importance, are emptying their liquids into the main branch of the river, so that the sewage has but a short distance to flow until it mixes with lake water, and is largely diluted with it, I do not believe that their effects are for the present specially noxious.

"It may be stated here that all the sewers south of Madison street, with the exception of a single one, are of not much importance, and that the sewage contained in them is but little richer in ammonia than the river water itself. The single sewer, however, to which I have made reference, is Monroe street sewer. The liquid contained in it is very rich in ammonia; contains coaltar-creosote (carbolic acid) and exhales copious quantities of sulphureted hydrogen; a lead paper held in a distance of four or five feet from the surface of the water is blackened almost immediately, provided that the current has a riverward direction. The discoloration of lead paper is effected in a much slighter degree by the sewage of other sewers.

"Admixed to the liquid discharged by the Monroe street sewer are tarry substances which have accumulated in the river to such an extent that its whole bed seems to be covered with it, for every steam tug wheeling up the water makes a portion of tar rise to the surface. The presence of these tarry substances can be traced from Adams street to Rush street bridge. Sulphuric ether agitated with the water extracts them readily; they may be separated from the ethereal solution by a subsequent spontaneous evaporation.

"Sewage in the Rush street sewer appears less charged with ammonia than in other sewers. This may look strange to some, as it is known that the greatest number of privies are connected with it. The water in this sewer is in a condition perfectly different from others. It is hot (heated by the condensing waters of the pumping works and breweries), and hence less apt to hold gaseous bodies in solution. Ammonia and its associates of miasmatic effluvia are therefore sent into the air as soon as generated. Hence this sewer becomes often very offensive to the inhabitants of the street, much more so than Randolph street sewer to the inhabitants of that street.

"From the above it may be seen, that 1st, The greatest portion of the impurities which give rise to putrid effluvia, enter into the North Branch of the Chicago river; that the urine, fœces, etc., from cattle, pigs, etc., fed on the swill of the still-houses, by being allowed to flow into this branch, are the most direct causes of noxious exhalations; that certain distilleries in allowing portions of the swill to run into the river contribute also their share to them.

"2. The Monroe street sewer discharges into the river a liquid which contains odorous substances that are usually produced in gas factories, which are more disagreeable than noxious.

"3. The city sewers alone are not yet of sufficient importance to create serious trouble, but will do so undoubtedly in the course of time.

"4. The slaughter and packing houses on the South Branch cannot be blamed *at present* — a conclusion which may be inferred from the fact that they are not and have not been working for several months previous to the commencement of this investigation. The question whether they do throw waste materials into the river, when working, can be settled only in the spring-time, after the river ice has given way.

"It is undoubtedly a matter of great importance how the existing nuisances can be abated. I cannot omit, however, to make here the remark that not all the odorous effluvia are sent forth by the Chicago river. The packing and slaughter house owners are at present not doing anything which is objectionable or deteriorating to our river water. But, if my information is correct, they leave large quantities of refuse matter in certain places near by, where they undergo putrefaction. The odor in the vicinity of such establishments is unbearable, and, I ask now, is the stench by which Bridgeport is infested, and which can be observed during a favorable wind even in our city business streets, less objectionable because it proceeds directly from the soil on which the animal refuse is thrown, and does not emanate from the river water? Are the gaseous bodies generated by putrefactive process less noxious in the first than in the latter case?

"I should propose that these men, instead of throwing a valuable azotized compound away, should use it up *for the produc-*

tion of saltpetre, which is an article commanding invariably a certain price, that would not only cover expenses, but secure a handsome profit. The same might be done by the owners of the stables and piggeries with the urine and manure. The gas factory, however, instead of pouring the wash water into the river, could use it for the *production of ammonial salts*, a thing which is done in most of the European cities with a great deal of advantage. By doing so, the offensive sulphureted hydrogen could be got rid of in a more complete manner than by using dry lime purifiers."

PLANS FOR IMPROVING THE RIVER.

Various plans have been suggested for freeing the river permanently from offensiveness, all of which may be divided into three classes:

1. Those which would drain the city into the Illinois river.
2. Those which would divert the Des Plaines into the South Branch of the river, and thus keep up a constant current to prevent offensiveness; and
3. Making canals from the lake to the North and South Branches, and driving water enough through them from the lake, to keep the river and branches comparatively pure at all times.

The 1st class is one requiring much larger means than the Board can at present control.

The 2nd class is defective, in that a supply of water from the Des Plaines would be likely to fail when most needed.

The 3rd class is undoubtedly feasible, would be completely under the control of the city, and there is every reason to believe would be effectual.

The proof that this plan would be effectual, will now be stated. The condition of the river a year ago last winter, when there was no rain for so long a time, will be remembered by all who were in the city then. It was never so offensive before for so long a time, and has not been so since. At the breaking up of the ice in the river, by the spring freshet, all the offensive water was discharged into the lake, leaving the river comparatively pure. It was not offensive again, till the approach of warm weather; then it became black and otherwise disgusting; and the only immediate remedy that suggested itself, was to induce the canal reasons in favor of the latter which ought not to be hastily set aside. These are, the equal ease with which a propeller-wheel could be made to drive water backwards or forwards, which the Bridgeport wheel could not do, though a modification of it might; the greater freedom from injury by floating ice or other substances; and the absence of all necessity of adjustment to suit extreme levels in the surface of the lake.

The probable cost of such a canal on North street, engine, wheel and house, would be as follows, viz.:

63,000 cubic yards excavation, including sheeting, bracing and pumping, at 75 cents, - - - -	$47,250
5,300 cubic yards brick masonry, 12 inches thick, at $10,	53,000
Engine house, engine and wheel, - - - -	35,000
Restoration of sewers, water and gas pipes, - -	4,750
Total, - - - - - -	$140,000

This canal, if constructed, could have no effect in purifying the North Branch, or the South Branch south of North street. Why not then expend what this one would cost towards making one from the lake across to the vicinity of Bridgeport, or one from the lake, north of the city limits, to the North Branch? Either of these canals would be about three times as long as this, and though they might not require to be arched over, would require, if made in open cutting, very flat slopes, and protecting walls to keep them from being filled with quicksand. Besides, railroad, common road and farm bridges would have to be maintained over them, and heavy land damages paid for room for the waste earth. Either one of them would cost very nearly or quite twice as much as the one proposed, and would cost much more to maintain.

Should the National or State government ever construct the contemplated ship canal to the Illinois river, neither of the canals now mentioned would be needed for purifying the South Branch, at least during the season of navigation, and probably not in winter, except when repairs might be needed.

The estimate for the North street canal includes a sufficient depth of cutting to place its bottom sixteen feet below low water. It could then be used as a part of the main outlet of a system of intercepting sewers, should one ever be adopted in this city, to keep the sewage out of the river and branches, and discharge it into the lake. The fact that they are carrying out such systems both in London and Paris, where they have so much skill and experience in matters of drainage, admonishes us that, sooner or later, we may be satisfied that such a system should be carried out here. It is well to keep this subject continually in mind, and fortunately for us, we have done nothing whatever to prevent the adoption of such a system whenever its necessity may become sufficiently apparent. It is equally fortunate that we are likely then to have the actual results of the experience of those great cities.

The reasons for recommending only the North street canal at present may be summed up as follows, viz.:

1st. The amount to be expended would not be more than about one-half of what would be necessary to carry out any other plan. The amount saved at first would, at seven per cent. compound interest, double itself in less than eleven years, so that at the end of that time, should it be necessary to make the longer canal further south, there would be no loss pecuniarily, supposing the North street canal should then become entirely useless.

2nd. The experience gained by the use of the short canal, would undoubtedly be of great value in settling important questions relative to the dimensions required for the longer ones, should they be needed, and to the amount of power and the best kind of apparatus for driving water through them.

3rd. Should the National or State government make the proposed ship canal to the Illinois river, there would be no need of a canal from the lake to the South Branch, south of North street.

4th. Should the developments of a few years more show that our sewage must be kept out of the river altogether, then no canals for driving lake water into the river would be needed. But in order to keep the sewage of the city out of the river, a system of intercepting sewers would have to be made along the river and branches, and discharge into the lake. The North street canal could then be used as part of the main trunk or outlet of such a system.

METERS.

Mr. O. F. Woodford, the water assessor, who has immediate charge of all the meters, reports the following as being now in use:

	20	⅝ inch.
	24	1 "
	16	2 "
	5	3 "
Whole number,	65	

All of which are Worthington's patent.

The favorable results anticipated from their use have been fully realized. The contrivance spoken of in the last annual report, for preventing their stoppage by sand and grit, has proved a perfect success, and is to be used hereafter wherever it may be applicable and needed. In some parts of the city, sand and grit are much less troublesome than in others.

The last annual report of the Cochituate Water Board mentions a wonderful reduction in the consumption of water, equal to an average of about *nine* gallons a day for each inhabitant, and attributable mainly to the use of meters.

SEWERAGE.

In consequence of financial difficulties, less work was done in this department in the early part of last summer than was desirable. The following tabular statements will show what has been done since January 1, 1862; also the whole amount of sewers built up to this time:

Return of Sewers Built in 1862, and to April 1st, 1863, and Repairs of Sewers for same period.

LOCALITY.	CONSTRUCTION.							REPAIRS.		
	6 foot Sewers built.	4½ foot Sewers built.	4 foot Sewers built.	3 foot Sewers built.	2 feet Sewers built.	1 foot Pipe Sewers laid.	No. Catch Basins built.	Lin. ft. Sewers repaired.	No. Catch Basins rep'd.	No. of Man Holes and Catch Basins altered to grade.
SOUTH DISTRICT.	No. ft.	No. ft.	No. ft.	No. ft.	No. ft.	No. ft.				
Ringgold Place, E of Calumet Av	567	....	....	....	....	....	..	....	....	....
Old st. from State st. sewer east	....	....	....	....	....	694	..	....	....	....
La Salle st. Madison to Jackson	....	....	....	....	....	1,381	..	....	....	....
Totals in South District......	567	....	....	....	....	2,075	22	10	43	136
WEST DISTRICT.										
Fulton street, Halsted to Peck..	....	4,572	....	....	....	....	..	....	....	....
Adams st. Halsted to W. Aberd'n	....	2,213	....	....	....	....	..	....	....	....
North st. Canal to Stewart Ave.	....	....	578	....	....	....	..	....	....	....
" " " Jefferson....	....	....	....	818	....	....	..	....	....	....
Canal st., N. from North st....	....	....	....	....	231	....	..	....	....	....
Jefferson st., N. from North st.	....	....	....	....	228	....	..	....	....	....
Centre street	....	....	....	....	....	310	..	....	....	....
Margaret street...............	....	....	....	....	....	188	..	....	....	....
Totals in West District	....	6,785	578	818	459	498	37	....	39	23
NORTH DISTRICT.										
Green Bay st. Chicago Av. to Div	....	2,721	....	....	....	....	..	....	....	....
Whitney st. G. Bay to Dearborn	....	....	....	....	734	....	..	..	....	....
Legg st., from Pine st. 450m E.	....	....	....	....	....	450	..	....	....	....
Totals in North District......	....	2,721	....	....	734	450	9	14	55	39
GRAND TOTALS..............	567	9,506	578	818	1,193	3,023	68	24	137	198

LENGTH IN FEET OF SEWERS LAID TO APRIL 1st, 1863.

Diamet'r in Feet.	SOUTH DISTRICT. Previous to 1862.	SOUTH DISTRICT. From Jan. 1, 1862, to Apr. 1,'63.	NORTH DISTRICT. Previous to 1862.	NORTH DISTRICT. From Jan. 1, 1862, to Apr. 1,'63.	WEST DISTRICT. Previous to 1862.	WEST DISTRICT. From Jan. 1, 1862, to Apr. 1,'63.	TOTAL FEET.
6	......	567	3,895	......	1,292	......	5,754
5	361	......	4,761	......	17,090	......	22,212
4½	......	......	......	2,721	2,010	6,785	11,516
4	1,952	......	5,498	......	5,208	578	13,236
3	13,605	......	3,828	......	......	818	18,251
2½	19,478	......	......	......	......	......	19,478
2¼	6,359	......	......	......	......	......	6,359
2	20,258	......	34,409	734	31,175	459	87,035
1	66,225	2,075	25,227	450	23,772	498	118,247
	128,238	2,642	77,618	3,905	80,547	9,138	302,088*

CATCH BASINS AND MAN HOLES.

Total Catch Basins built previous to 1862, - - -		1,192
" " " " from Jan. 1, 1862, to Apr. 1, '63,		72
		1,264
Total Man Holes built previous to 1862, -	2,135	
" " " " since Jan. 1, 1862, -	66	2,201

Of the above Catch Basins, there were built since Jan. 1, 1862—

In South District, 22, at a cost of -	$759.38
In West District, 37, " " " -	1,465.66
In North District, 13, " " " -	558.79
	$2,783.83 †

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* Equal to 57 $\frac{1128}{5280}$ miles.

† Average $38.66 each.

COST OF CLEANSING SEWERS AND CATCH BASINS.

YEAR.	SEWERS.	CATCH BASINS.	TOTAL.
1859	$1,492.59	$479.00	$1,971.59
1860	5,087 08	532.40	5,619.48
1861	4,199.85	1,274.18	5,474.03
1862 and 1st Quar. 1863	4,146.10	627.25	4,793.35

1,232 catch basins cleansed in 1862-3.

Cost of repairs of sewers, catch basins, and man holes, in 1862, $2,196.30.

Mr. William H. Clarke, the Assistant Engineer of the Board, who has, together with Assistant Engineer, Wm. C. Bryson, had charge of the sewers constructed the past year, and who has for several years had special charge of the private drain department, reports that the following permits for house drain connections with the sewers have been issued during this period:

PART OF CITY.	4 in. drains.	6 in. drains.	9 in. drains.	Total.
North District....................	1	110	9	120
South District....................		167	11	178
West District.....................		64	3	67
	1	341	23	365

Mr. Clarke further reports, that—

"All of the drains under these permits, (except nine, which have not yet been put in,) have been laid under his inspection, and plats have been made of the same, which have been transferred to the plans of the office.

"The whole number of private drains in the city now is, 2,802. The drain layers now acting under the licenses of the Board are generally disposed to do their work in conformity with the regulations thereof, and he has found no obstructions during this year, occurring in the drains laid by them, to be charged to defective construction. The obstructions have been, as heretofore, caused by the introduction of improper substances into the drains, such as grease, rags, etc., and have been chiefly confined to hotels, eating houses, railroad depots, etc.

"Seventy-six notices have been served upon the owners of lots in the several divisions of the city, requiring them to make connections with the sewers, or to put in order drains already laid, all of which have been complied with, with the exception of five, in two of which cases the drains have been put in by the Board and the expense of the work assessed upon the lots benefited, under the authority of the sewerage law, and three were, on account of the approach of winter, deferred until another season.

"In view of the filthy condition of some of the street gutters, occasioned by the discharge of wooden drains into them from the lots opposite, it is recommended that early in the season a general inspection of the streets should be made, and that drains should be ordered to connect such lots with the sewers wherever such nuisances exist in the sewered streets, beginning with those streets where the improvements are most valuable, and gradually extending such house drainage over all parts of the city where sewers are laid in the streets. This would not only be beneficial as a sanitary measure, but would diminish the expense of street cleaning very materially, and improve the character of the roadway of the streets. The beneficial effects of such general connections with the sewers has been fully shown by the operations of the past year, where the same has been done."

Besides the reasons given by Mr. Clarke for draining all lots which now cause nuisances by lacking such drainage, it should be remembered that the more lots and houses are drained into the sewers, the more perfect will be the action of the sewers, and the freer will they become from unpleasant smells in times of protracted drought.

The condition of the river, with recommendations relative to pumping it, will be found under the head of Water Works. The usual soundings were taken in the winter, and a slight accumulation of deposit was found to have been made in some places during the year. The expected freshet and scour of the river, at the breaking up of ice in the spring of 1862, did not take place. The freshet of this spring, from which very little was expected, is believed to have had a much greater scouring effect upon the river than that of last year, but it has not been convenient to take soundings since then.

Which is respectfully submitted.

E. S. CHESBROUGH,

City Engineer.

REPORT OF THE SUPERINTENDENT OF CEMETERY GROUNDS AND PUBLIC PARKS.

Chicago, April 10, 1863.

To the Board of Public Works of the City of Chicago:

Gentlemen:—I submit herewith the accompanying statements showing the improvements made under my charge from January 1, 1862, to April 1, 1863.

CHICAGO CEMETERY.

There have been clayed, graded and graveled in the Cemetery, 375 feet, from the main entrance of the Cemetery east to the County vault; thence north and north-west, 455 feet, to opposite Bates' (now Wright and McClure's) vault; thence north-east, 230 feet, to the first avenue, running east and west; thence west, along said avenue, 540 feet; thence north-west, the road along the west fence, 1,505 feet, to the third avenue, east and west, north of the main entrance; making, in all, three-fifths of a mile in length, and from one to two rods in width.

We have also clayed and graded the above mentioned third cross avenue, and are now ready for the graveling of the same. The clay has been put on the roads above mentioned, from two to four inches thick, and the gravel about two inches on the top of the same.

We have also cleaned from most of the alleys and lots the dead limbs, rubbish, etc.; trimmed the trees and cut down the underbrush; trimmed the trees in the northern part of the Cemetery, generally known as the Park; planted a row of maple trees along the first road, along the fence on the west side of the Cemetery, which are as yet all alive and doing well.

We further planted evergreens along the cross avenues (running east and west) and the center pieces, which I am able to report as all being alive and in good condition.

About six months ago a large portion of the west and south fence of the Cemetery was blown down and damaged by a strong wind, on account of the posts being rotten, and we have repaired it as well as is possible under the circumstances.

A portion of the fence on the east side of the Cemetery was almost covered by drifted sand. The boards of this fence being rotten, we considered it best not to raise it, but to put new boards above the old ones where the sand had covered them.

There have been buried in the public grounds during the time specified, 2,218 persons, exclusive of the rebel prisoners, which were 615 in number; making the total of interments in these grounds, 2,833. There was no record kept of the interments in the public grounds until June, 1861.

The number of burials on private lots I cannot report, for the reason that the grave diggers were not under my charge until after January 23, 1863. Since that time and up to date, there have been interred in private lots, sixty-two persons.

There was expended for the improvements herein named $3,943.11.

WASHINGTON PARK.

There have been set out in this park the past season, seventy trees. Twenty-seven have been broken or destroyed. I have replanted them without expense to the city. The posts at the gateways have been reset to keep out the cattle. I am informed that the posts are taken up to let the cattle into the park. If this evil continues, we shall be compelled either to maintain a watch, or use steps instead of posts, as at Union Park. I have cut walks across from the corners to keep persons off the sward. The Board having ordered that there be none but large trees planted for the city parks, we have planted eight on each side of the cross walks.

DEARBORN PARK.

Trees were planted last year in place of those that had previously died, and a few of the former are to be reset without cost. The citizens living near this park are desirous of having it better ornamented and more substantially improved than is possible with the small means appropriated for the parks of the city.

JEFFERSON PARK.

The fence was repaired, and one row of trees planted around and inside of the fence.

UNION PARK.

Repairs have been made on the fence, and some of the trees which had died have been replaced. About six tons of hay were cut, which was taken by the Water Department.

Respectfully submitted.

JOHN C. URE.

FINANCIAL STATEMENT.

Trial Balance, Ledger, Board of Public Works, March 31, 1863.

WATER DEPARTMENT.

	DR.	CR.
Water Works..............................	$1,118,494.97	
Water Works Income......................		$933,538.99
Water Loan Bonds, 6 per cent		1,030,000.00
Water Loan Bonds, 7 per cent		103,000.00
Water Loan Interest........................	454,283.49	
Water expenses and repairs	321,889.21	
Discount on 6 per cent. Water Loan Bonds	82,235.41	
Water Fund in hands of City Treasurer	23,235.07	
Water Pipes................................	16,213.57	
Water Works Stock	12,055.49	
Water Works Coal	661.68	
Water Works Service Cocks.................	79.67	
Duncan, Sherman & Co., (Coupon acc't)......	35,625.00	
Water Works Work Shop..................	1,765 43	
	$2,066,538 99	$2,066,538.99

WATER FUND.

Statement of the Cash Receipts by the Board of Public Works from January 1st, 1862, to March 1st, 1863, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time.

RECEIPTS.

Water tax collected	$188,649.59		
Receipts shutting off and letting on water	137.04		
Receipts for tapping pipes	2,634.45		
" for sale of pipes, coal and materials	752.81		
Receipts for laying pipes and putting in hydrants on private premises	1,655.62	193,829.51	
Add—			
Balance in hands of City Treasurer January 1st, 1862		$11,136.38	$204,965.89

EXPENDITURES.

ADDITIONS TO WATER WORKS.

NEW MAIN ON PINE STREET, WABASH AVENUE, AND ADAMS STREET.

	Cash Payment.	True Cost.
Paid Scammon, McCagg & Fuller for legal opinion as to right of way	$25.00	$25.00

IMPROVEMENT OF GROUNDS AROUND PUMPING WORKS.

			Cash Payment.	True Cost.
Labor, filling and laying out grounds		$1,600.38		
Trees, evergreens, and labor planting		332.86		
Iron and castings for fence		926.01		
Stone and stone work for fence, coping and steps		1,275.05		
Lumber and posts		79.79		
Fountain		22.35		
Painting fence		50.44	4,286.88	
Add—				
Work at shop on fence	$519.59			
Depreciation of work shop fixtures	53.33	$572.92		4,859.80
Amounts carried forward			$4,311.88	$4,884.80

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$4,311.88	$4,884.80
SURVEY FOR OBTAINING THE SUPPLY OF WATER FROM A NEW LOCALITY.				
Labor of men boring for clay, etc.		$84.91		
Expense of boring apparatus		61.73	146.64	146.64
DISTRIBUTING PIPES LAID.				
Cast iron pipes, generally 4 and 6 inch.		$13,024.93		
Testing and laying pipes		2,533.72		
Trenching and back filling		4,448.33		
Lead		3,266.99		
Rent of testing yard		818.10		
Repairs of testing press		29.16		
Hauling pipes		478.84		
Dredging and repairing dock		260.57		
Caps, sleeves and small castings		353.62		
Hydrant patterns		72.83		
Hydrant and stop-cock boxes		576.42		
Catch basins for hydrants		307.21		
River pipe		325.78		
Coal		76.05		
Miscellaneous		119 68	26,692.23	
ADD—				
Pipes used previously paid for	$13,478.03			
New hydrants put in	463.23			
New stop-cocks put in	380.69			
Work on press and tools at shop	48.04			
Oil used	7.44			
Deprec'n work shop fixtures	117.48	$14,494.91		
DEDUCT—				
Am't received for hydrants put in, work done and pipes laid for private parties	$1,655.62			
Lead charged repairs and meters	59.77			
Pipes charged repairs	89.35			
Pipes sold	185.23	1,989.97		
		$12,504.94		39,197.17
Total addition to cost of Water Works			$31,150.75	$44,228.61

			Cash Payment.	True Cost.
Amounts brought forward			$21,484.52	$28,971.97
IMPROVEMENT OF RESERVOIR GROUNDS.				
Filling grounds West Reservoir		$41.63		
Trees for reservoir grounds		75.00	116.63	116.63
CONSTRUCTING NEW INLET.				
Labor		$1,259.45		
Carpenter work		1,103.06		
Lumber		809.43		
Dredging		600.00		
Spikes and nails		69.82		
Use steam pump		80.00		
Coal		31.54		
Stone		31.85		
Miscellaneous		381.47	4,366.62	
ADD—				
Work at shop		$44.83		
Oil, tallow, ropes, etc., used		17.11		
		$61.94		
DEDUCT—				
Lumber sold	$31.70			
Sand sold	10.00	41.70		
		$20.24		4,386.86
DREDGING BASIN.				
Expenses dredge work of basin at pumping works			959.69	959.69
WATER METERS.				
64 meters, freight, fittings, etc.		$4,383.67		
Repairs		412.69		
Setting		325.56		
Plumbing		192.33		
Carpenter work		90.01		
Lumber		30.25		
Iron work		143.26		
Miscellaneous		83.67	5,661 44	
DEDUCT—				
Valuation meters, charged stock	$3,033.80			
Plumbing paid back	7.30	$3,041.10		
Amounts carried forward		$3,041.10	$32,588.90	$34,435.15

			Cash Payment.	True Cost.
Amounts brought forward		$3,041.10	$32,588.90	$34,435.15
Add—				
Work at shop	$5.24			
Lead used	9.75	14.99		
		$3,026,11		2.635.33

OFFICE EXPENSES AND SALARIES.

Salaries, Commissioners	$2,918.62		
Salary, Secretary	600.00		
Salary, Engineer	1,200.00		
Salary, City Superintendent	400.00		
Salaries, Clerks	2,191.08		
Salaries, Water Assessor and Collectors	4,785.32		
Salaries, Draughtsmen	446.00		
Labor, care of office, etc.	254.50		
Blank books, stationery, binding and printing	834.93		
Advertising	140.18		
Newspapers	12.74		
Office furniture and repairs	138.44		
Expenses horse keeping and repairs buggy (ass'r.)	105.67		
Scientific books	98.35		
Miscellaneous	111.43	14,237.26	14,237.26
Total operating expenses		$46,826.16	$51,307.74

WORK SHOP.

Lathe, engine, planer, drill and belting	$940.26	
Shaft, flange and pulleys	64.96	
Labor	1,506.04	
Iron work	22.17	
Lumber	101.19	
Mason work	25.87	
Carpenter work	131.50	
Iron, steel and hardware	201.06	
Castings and bolts	2,107.20	
Coal	45.50	
Lead	53.15	
Miscellaneous	187.45	$5,386.35
Amount carried forward		$5,386.35

			Cash Payment.	Trus Co
Amount brought forward....................			$5,886.85	
Deduct—				
Cash receipts for work....	$82.48			
Amount charged repairs ..	1,230.49			
Am't charged pump'g works	247.40			
Am't charged engine house improvement.........	572.92			
Am't charged new inlet ..	44.83			
Am't charged meters....	5.24			
Am't charged distributing pipes................	1,009.44			
Am't charged stock for stop-cocks....	404.69			
Am't charg'd miscellaneous	28.58	$3,626.02		
Add—				
Oil used........................		5.10		
		$3,620.92		1,765.

BONDS PURCHASED.

10 Seven per cent. Bonds canceled................			9,291.17	
Add—				
Discount on Bonds, less exchange on draft......................		$708.83		10,000.

INTEREST.

Interest on Water Loan Bonds, July 1, 1862, and January 1, 1863.........		$69,010.00		
Commission to Duncan, Sherman & Co. exchange and advertising..........		340.41	69,350.41	
Add—				
Amt transferred from Disct. to Inst.		$2,655.19		
Deduct—				
Discount on 10 Bonds purchased....		708.83		
		$1,956.36		71,306.

STOCK.

Horses purchased....................		$275.00		
Amounts carried forward		$275.00	$84,027.93	$83,072

			Cash Payment.	True Cost.
Amounts brought forward		$275.00	$84,027.93	$83,372.20
Wagons and harnesses		166.50		
Hydrant and Box		15.00	456.50	
ADD—				
Valuation stop cocks made at shop		404.69		
" meters furnished		3,033.80		
Balance, Atlas of City transferred		877.00		
DEDUCT—		$4,315.49		
Horse sold	$25.00			
Depreciation of meters, old hydrants, stop cocks etc	1,278.31	1,303.31		
		$3,012.18		3,468.68
COAL.				
Coal purchased not used			1,072.83	
DEDUCT—				
Amt. refunded for coal not received.		411.15		661.68
ATLAS FOR THE CITY.				
Locks and additions to Atlas			37.00	37.00
INCOME.				
Rents paid back		$121.31		
Uncurrent money taken		80.00	201.31	
WATER PIPES.				
Pipes purchased and not used			16,213.57	
SERVICE COCKS.				
Services of tapper		$649.98		
Service cocks purchased		846.93		
Cast iron boxes and iron work		144.77		
Permits not used refunded		5.50		
Tools and miscellaneous		97.59	1,744.77	
ADD—		$1,744.77		
Service cocks previously paid for		122.83		
Amounts carried forward		$1,867.60	$103,753.81	$87,289.56

			CASH PAYMENT.	TRUE COST.
Amounts brought forward		$1,867.60	$103,753.91	$87,239.56
Cash receipts for tapping,	$2,624.95			
Old cocks sold, and misc.	9.50			
Service cocks on hand April 1, 1863	79.67			
Profit on service cock ac.		846.52		
	$2,714.12	$2,714.12		
Total addition to Water Works brought forward			31,150.75	44,228.61
Total operating expenses brought forward			46,826.16	51,307.74
			$181,730.82	$182,775.91

Total amount of Cash expenditures	$181,730.82
Bal. of Cash in hands of City Treasurer, Apr. 1, '63,	23,235.07
	$204,965.89

SEWERAGE DEPARTMENT.

Trial Balance, Ledger, Board of Public Works, March 31st, 1863.

	DR.	CR.
Sewers North Division	$206,178.16	
Sewers South Division	256,395.57	
Sewers West Division	263,496.55	
S. Lind, Treasurer Sewerage Commissioners	108,696.58	
Sewerage Loan Bonds, 6 per cent		87,000.00
Sewerage Loan Bonds, 7 per cent		875,000.00
Sewerage Loan Bonds canceled		38,000.00
Sewerage Sinking Fund		42,398.26
Sewerage Sinking Fund Mortgages	25,717.10	
Discount on Sewerage Bonds	30,220.26	
Sewerage Loan Interest Account		27,761.52
House Drains	13,244.87	
Sewerage Pipes	8,379.46	
Sewerage Bricks	7.60	
Sewerage Stock	2,074.48	
American Exchange Bank	34,330.00	
Dennis Coughlin	1,561.51	
Patrick Smith	1,347.75	
Amounts carried forward	$951,649.84	$1,070,159.78

	CASH PAYMENT.	TRUE COST.
Amounts brought forward..................	$951,649.84	$1,070,159.78
Galena and Chicago Union Railroad Company......		382.55
Sewerage Funds in hands of City Treasurer	87,624.43	
Cement account.................	8.75	
Sewerage Sinking Fund with City Treasurer	10,430.60	
South half Lot 5, Block 123, S. S. Add............	6.68	
Lot 5, Block 1, Johnston, Roberts & Storrs' Add....	10.79	
Pittsburgh and Ft. Wayne Railroad Company		616.84
Z. Cobb, Ag't, S. 80 ft. W. half Lot 7, Block 36, O. T.	31.53	
Chicago Burlington and Quincy Railroad Company..		3,303.67
Charles H. Cook................................		69.00
Sewerage man hole and catch basin covers	758.68	
Sewerage expenses and repairs....................	23,783.09	
East quarter of Lot 2, Block 31, O. T..............	227.45	
	$1,074,531.84	$1,074,531.84

SEWERAGE FUND.

Statement of the Cash Receipts by the Board of Public Works, from January 1, 1862, to March 31, 1863, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time.

RECEIPTS.

Am't received of J. Y. Scammon in settlement of balance of Sewerage Fund in Marine Bank.....	$52,994.56	
Proceeds sixty 7 per cent. bonds sold, and prem..	60,901.28	
Rec'd from city balance Sewerage Tax of 1861...	78,027.66	
Rec'd from city account Sewerage Tax of 1862..	70,570.36	
Rebate of interest on loan paid S. Sturges & Sons.	52.76	
Interest on collateral of E. I. Tinkham & Co.....	450.00	
House drain permits issued....................	1,822.50	
Materials sold and work done for private parties..	3,307.94	$268,127.06

EXPENDITURES.

SEWERS—SOUTH DIVISION.

Labor.............................	$1,475.44
Services Engineer..................	86.67
Amount carried forward...........	$1,562.11

			CASH PAYMENT.	TRUE CO
Amount brought forward		$1,562.11		
Cement		149.34		
Bricks		84.00		
Lumber		31.35		
Miscellaneous		34.50	1,861.30	
ADD—				
Expense Sewer on Ringold Place	$4,069.68			
Cement used previously paid for	1.01			
Bricks used previously paid for	48.80			
Pipes used previously paid for	1,108.46			
Work done for Gas Co	5.72	$5,233.67		
DEDUCT—				
Receipts for work done		46.69		
		$5,186.98		7,048.

SEWERS—WEST DIVISION.

Labor		$1,334.31		
Cement		222.61		
Services Engineer		112.50		
Lumber		33.51		
Miscellaneous		11.79	1,714.72	
ADD—				
Pipes used previously paid for		$588.56		
Bricks used previously paid for		11.20		
Expense sewer on Fulton street		19,184.21		
" " Adams "		8,446.01		
" " North "		2,214.52		
Exp'se sewer Canal and Jefferson st.		1,705.99		
Expense sewer Margaret street		69.00		
		$32,219.49		
DEDUCT—				
Receipts for work done		72.28		
		$32,147.21		33,861.
Amounts carried forward			$3,576.02	$40,910.

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$3,576.02	$40,910.21
SEWERS—NORTH DIVISION.				
Labor		$1,565.60		
Earth for covering sewers		238.26		
Services Engineer and Inspectors		125.00		
Repairs water pipes		12.96		
Lumber		37.87		
Cement		19.48		
Miscellaneous		23.33	2,022.50	
ADD—				
Bricks used previously paid for	$100.80			
Pipes used previously paid for	417.35			
Covers used previously paid for	21.90			
Expense sewer Green Bay street	12,666.99			
Expense sewer Whitney street	1,151.26	14,358.30		
DEDUCT—				
Received for work done		26 50		
		$14,331.80		16,354.30

SEWERAGE INTEREST.

Interest on Sewerage Loan Bonds, July 1, 1862, and January 1, 1863		$65,070.00		
Commissions to American Exch. Bank, Exchange and advertising		209.44		
Accrued interest on 20 bonds purch'ed		233.33		
Over remittance to Am. Exch. Bank to apply on interest due July 1, 1863		700.00	66,212.77	
ADD—				
Discount on balance funds in Marine Bank, as per agreement		$5,888.28		
DEDUCT—				
Int'st rebated by S. Sturges and Sons on loan paid before maturity	$52.76			
Interest and premium on 60 bonds sold	901.28	954.04		
		$4,934.24		71,147.01
Amounts carried forward			$71,811.29	$128,411.52

			Cash Payment.	True C
Amounts brought forward			$71,811.29	$128,411
CLEANSING SEWERS—SOUTH DIVISION.				
Labor		$1,562.11		
Water for flushing		226.65		
Tools and repairs		52.46		
Miscellaneous		9.65	1,850.87	
Deduct—				
Receipts for work done		$2.25		1,848
CLEANSING SEWERS—WEST DIVISION.				
Labor		$1,161.52		
Water for flushing		226.65		
Tools and repairs		28.71		
Miscellaneous		13.18	1,430.06	
Deduct—				
Receipts for work done		$4.50		1,425
CLEANSING SEWERS—NORTH DIVISION.				
Labor		$1,352.87		
Water for flushing		226.65		
Tools and repairs		30 76		
Miscellaneous		12.78	1,623.06	1,623
REPAIRS OF SEWERS—SOUTH DIVISION.				
Labor		$808.98		
Tools and repairs		45.91		
Cement		40.32		
Services Engineer		15.31		
Lumber		2.58		
Miscellaneous		3.67	916.77	
Add—				
Cement used previously paid for	$3.04			
Bricks used previously paid for	97.37			
Covers used previously paid for	147.32			
Depreciation of tools, etc.	97.81	345.54		
Deduct—				
Receipts work done	$61.96			
Lumber sold	3.90	65.86		
		$279.68		1,1
Amounts carried forward			$77,632.05	$184,5

			Cash Payment.	True Cost.
Amounts brought forward			$77,632.05	$134,505.21
REPAIRS OF SEWERS — WEST DIVISION.				
Labor		$408.42		
Tools and repairs		45.91		
Cement		23.95		
Services Engineer		15.31		
Lumber		2.59		
Miscellaneous		1.67	497.85	
Add—				
Bricks used previously paid for	$55.78			
Covers used previously paid for	147.32			
Depreciation tools, etc.	97.81	$300.91		
Deduct—				
Receipts work done		1.46		
		$299.45		797.30
REPAIRS OF SEWERS — NORTH DIVISION.				
Labor		$586.46		
Tools and repairs		45.92		
Cement		52.16		
Labor Engineers		15.30		
Lumber		2.58		
Miscellaneous		.40	702.82	
Add—				
Bricks used previously paid for	$129.37			
Covers used previously paid for	147.32			
Depreciation tools, etc.	97.80	$374.49		
Deduct—				
Receipts for work done		46.99		
		$327.50		1,030.32
HOUSE DRAINS.				
Services Engineer		$1,500.00		
" Rodman		9.00		
Horse keeping for engineer		150.00		
Miscellaneous		69.85	1,728.85	
Amounts carried forward			$80,561.57	$136,332.83

			Cash Payment.	Treas Co
Amounts brought forward			$80,561.57	$136,332.
Deduct—				
Cash receipts for permits..	$1,822.50			
Permit charg'd ownert lots 17, 18, 19, block 67, O. T.	15.00	$1,837.50		
Add—				
Pipe injunctions used.......... ...		847.47		
		$990.03		738.

MAN HOLE AND CATCH BASIN COVERS.

Labor		$417.82		
Lumber..........................		330.94		
Spikes and nails		119.50		
Tar		41.00	909.26	
Deduct—				
Covers sold..............	$71.62			
Covers used for sewers and repairs................	468.96	$540.58		
Add—				
Covers on hand from stock account......	$381.00			
Hauling lumber..........	9.00	390.00		
		$150.58		751

OFFICE EXPENSES AND SALARIES.

Salaries Commissioners..............	$2,706.29		
Secretary..........................	750.00		
Engineer	1,500.00		
Assistant Superintendent............	400.00		
Clerks	2,194.87		
Blank Books and Stationery	133.23		
Printing...........................	62.02		
Advertising and daily papers	89.28		
Office fixtures and repairs............	36.69		
Express charges on Bonds..	80.00		
Lithographing Bonds................	64.68		
Miscellaneous......................	62.70	8,079.76	
Amounts carried forward....................		$89,550.59	$137,82

			Cash Payment.	True Cost.
Amounts brought forward			$89,550.59	$137,830.38
DD—				
Expenses in suit against S. Lind transferred	$22.00			
Expense charges transfer'd.	30.00	$52.00		
EDUCT—				
Advertising charged owners of Lots 17, 18, 19, Block 67, O. T.	$9.00			
Rec'd for Engineers' salaries	40.00	49.00		
		$3.00		8,082.76

GREEN BAY STREET SEWER.

B. Benedict, and Carlin & McCabe, on contract		$6,675.09		
ement		1,043.37		
ricks		4,558.61		
ngineer and Inspectors		372.32	12,649.39	
DD—				
Pipes used	$57.60			
EDUCT—				
Bricks used for other sewers	40.00	17.60		12,666.99

WHITNEY STREET SEWER.

abor		$661.68		
ricks		385.00		
ement		127.85		
ervices of Inspectors		15.93	1,190.46	
EDUCT—				
Bricks used for other sewers	$60.80			
DD—				
Pipes used	21.60	39.20		1,151.26

FULTON STREET SEWER.

B. Benedict, on contract		$8,932.44		
ment		2,446.52		
icks		7,128.60		
gineers and Inspectors		525.96		
iscellaneous		64.29	19,097.81	
Amounts carried forward			$122,488.25	$159,731.34

			CASH PAYMENT.	TRUE CO
Amounts brought forward			$122,488.25	$159,731.
ADD—				
Pipes used		$86.40		19,184.
ADAMS STREET SEWER.				
J. Duffy, account contract		$3,898.73		
Cement		856.04		
Bricks		3,226.90		
Engineers and Inspectors		393.94		
Miscellaneous		33.50	8,409.11	
ADD—				
Pipes used		$36.90		8,446.
NORTH STREET SEWER.				
Langan & McHugh on contract		$312.11		
Bricks		829.10		
Cement		221.39		
Services Engineers		25.00		
Miscellaneous		8.44	1,396.04	
ADD—				
Amount paid Langan & McHugh by C., B. & Q. R. R. Co	$700.00			
Pipe junctions used	37.20			
Covers used	9.00			
Miscellaneous labor transf'd	72.28	818.48		2,214.
RINGOLD PLACE SEWER.				
J. B. Benedict, on contract		$2,663.81		
Engineers and Inspectors		289.82		
Bricks		1,105.75	4,058.88	
ADD—				
Pipes used		$10.80		4,069.
LAKE STREET SEWER.				
Paid sundry parties amounts advanced by them to construct sewer			511.91	
Samuel T. Foss.				
Paid him am't advanced to construct sewer			175.00	
Amount carried forward			$137,039.19	

	Cash Payment.	
Amount brought forward	$137,039.19	
William Smith & Co.		
Paid them am't advanced to construct sewer	125.00	
S. Meyers.		
Paid him for 30,000 bricks previously purchased	157.50	
L. P. Hilliard.		
Labor and materials for drain	5.07	
C. Beers.		
Labor and materials	2.46	
South half Lot 5, Block 123, S. S. Add.		
Private drain constructed	6.68	
Lot 5, Block 1, Johnston R., & Stow's Add.		
Private drain constructed	10.79	
Stock.		
Oak sheeting and tools purchased	492.43	
Cement.		
Cement purchased	12.18	
Sewerage Pipes.		
Pipes purchased	488.15	
Sewerage Bricks.		
Bricks purchased	379.60	
Bills Payable.		
Paid loan to S. Sturges & Son	15,000.00	
MISCELLANEOUS.		
Proportion of delinquent taxes 1861 previously credited, not collected, paid back	1,191.59	
Amount paid to sinking fund for its proportion of sewerage tax 1861, collected	15,534.60	
Amount paid to sinking fund for its proportion of all cash received from late Board of Sewerage Commissioners	9,894.92	
Total cash expenditures	$180,340.16	
ADD—		
Amount overdrawn with City Treasurer, Jan. 1, '62,	162.47	
Balance in hands of City Treasurer, April 1, 1863,	87,624.43	$268,127.06

SEWERAGE SINKING FUND.

RECEIPTS.

Interest on Sinking Fund mortgage—Hiram Joy	$887.02
Interest on Sinking Fund mortgage—Timothy Wright	2,486.46
Amount carried forward	$3,373.48

	CASH PAYMENT.	TRUE COST.
Amount brought forward	$3,378.48	
Account of principal Sinking Fund mortgage—Timothy Wright	750.00	
Proportion of Sewerage Tax 1861	15,584.60	
Proportion of all Cash received from late Board of Sewerage Commissioners	9,894.92	
	$29,558.00	
Balance in hands City Treasurer, January 1, 1862	1,135.05	$30.668.05

EXPENDITURES.

20 Bonds purchased and canceled, Nos. 351 *B* to 370 *B*, inclusive, 7 per cent	$20,000.00	
Express charges on Bonds	30.00	
Certificates of Tax sales on East ½, of Lot 2 in Block 31, O. T., property embraced in sinking fund mortgage—W. Hilderbrand	227.45	
	$20,257.45	
Balance in hands of City Treasurer, April 1, 1863	10,430.60	$30.668.05

CITY DEPARTMENT.

Trial Balance, Ledger, Board of Public Works, March 31, 1863.

Chicago Cemetery		$655.54
Street Lamps West Division		301.25
City Appropriation Fund	$30,791.96	
North Division		6,544.32
South Division		1,973.51
West Division		6,546.76
Public Buildings		749.71
Lumber account	966.19	
Paving in front of Post office		814.66
Bridge Department		4,738.67
City expense account office		926.11
Chicago harbor		415.68
Public Parks		130.70
City proportional expense account		3,303.85
Intersections of streets		4,657.39
Special assessments	5,071.20	
Amounts carried forward	$36,769.35	$31,758.15

	CASH PAYMENT	TRUE COST.
Amounts brought forward	$36,769.35	$31,758.15
North Clark street improvement		471.00
Kinzie and North Water street improvement.......		4,012.08
Lake street improvement		528.80
Sidewalk improvements..........................		8.00
South Water street improvement.................		131.90
South Wells street improvement..................	80.58	
	$36,909.93	$36,909.93

BOARD OF PUBLIC WORKS APPROPRIATION FUND.

Statement of the Cash Receipts by the Board of Public Works. from January 1, 1862, to March 31, 1863, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time.

RECEIPTS.

Amount appropriated by Common Council........	$76,593.16	
Street taxes collected	14,971.50	
Permits issued, etc............................	252.02	
Digging graves in cemetery, and sand sold.........	1,194.00	
Filling Haven school house lot..................	232.80	
Lumber sold to city............................	318.79	
Damage to bridges...............	87.56	
Rebate on assessments for street intersections... .	224.47	
From town of South Chicago..................	437.50	
	$94,311.80	
ADD—		
Am't of cemetery fund unexpended, Jan. 1, '62.	1,404.65	
	$95,716.45	
Balance with City Treasurer, Jan. 1, 1862..... ..	51,722.76	$147,439.21

EXPENDITURES.

SOUTH DIVISION.

Labor on streets and sidewalks........	$10,445.19
Lumber............................	950.92
Stone	741.44
Gravel	963.32
Amount carried forward	$13,100.87

			Cash Payment.	True
Amount brought forward		$13,100.87		
Nails and spikes		249.39		
Services Engineer and Rodman		162.22		
Distributing street tax notices		625.50		
Printing street tax notices		13.50		
Street taxes refunded		3.00		
Repairing paving		183.81		
Repairing gutters		11.94		
Tools and repairs		64.86		
Building wall		92.32		
Altering catch basin		58.85		
Carpenter work		38.62		
Miscellaneous		113.23	$14,718.11	
Deduct—				
Permits issued and miscellaneous receipts	$11.80			
Filling Haven school house lot	232.80	344.60		14,3
WEST DIVISION.				
Labor on streets and sidewalks		$10,308.57		
Lumber		1,973.62		
Stone		1,915.00		
Nails and spikes		443.42		
Distributing street tax notices		617.50		
Serving sidewalk notices		234.00		
Street taxes refunded		3.00		
Printing street tax notices		20.00		
Services Engineer and Rodman		162.23		
Tools and repairs		119.64		
Miscellaneous		16.08	$15,813.06	
Deduct—				
Permits issued, and misc. receipts		$61.00		15,
NORTH DIVISION.				
Labor on streets and sidewalks		$8,788.63		
Lumber		1,561.38		
Gravel		550.98		
Stone		128.35		
Nails and spikes		299.49		
Amounts carried forward		$11,328.83	$30,531.17	$30,

			Cash Payment.	True Cost.
Amounts brought forward........		$11,328.83	$30,531.17	$30,125.57
Services Engineer, Rodman and Inspector		380.22		
Distributing street tax notices........		649.50		
Printing street tax notices............		19.50		
Street taxes refunded................		1.50		
Repairing paving		9.04		
Tools and Repairs..................		41.62		
Miscellaneous......................		20.48	12,450.69	
Deduct—				
Receipts for permits issued, and miscellaneous		$69.22		12,381.47

CHICAGO CEMETERY.

Labor and teams....................		$3,009.88		
Salary Superintendant		333.30		
Trees and shrubbery		345.00		
Lumber		166.88		
Hardware and tools		82.20		
Miscellaneous		5.85	3,943 11	
Deduct—				
Receipts digging graves, sand sold, etc	$1,194.00			
Cemetery fund unexpen'd, January 1, 1862......	1,404.65	2,598.65		1,344.46

STREET LAMPS — WEST DIVISION.

105 Iron posts..................		$1,312.50		
105 Lamps and fittings		1,273.75	2,586.25	2,586.25

LUMBER ACCOUNT.

Lumber purchased not used			809.66	
Deduct—				
Am't sold city and refunded for lumber not received		$307.79		501.87
Amounts carried forward....			$50,320.88	$46,939.62

PUBLIC BUILDINGS.

ENGINE HOUSES.

		Cash Payment.	True Co
Amounts brought forward		$50,320.88	$46,939.
Carpenter work	$590.08		
Lumber	364.87		
Plumbing and gas fitting	201.11		
Iron work	33.51		
Nails	42.49		
Painting and glazing	76.62		
Ground rent lot engine house No. 15	30.00		
Roofing	79.10		
Miscellaneous	3.44	1,421.22	1,421.
LARRABEE STREET ENGINE HOUSE.			
Paid Wm. Arend balance contract for building	$378.00		
Interest on estimates	16.67	394.67	394.
COURT HOUSE.			
Carpenter work	$109.98		
Iron work	52.07		
Calcemining, painting and glazing	135.25		
Plastering Recorder's court room, and carpet for same	398.98		
Gas fitting	9.75		
Repairs roof	3.60		
Watching building	48.00		
Miscellaneous	28.00	785.63	785
NORTH MARKET.			
Plumbing	$48.71		
Iron work	6.66		
Carpenter work	2.87		
Gas fixtures	2.25	60 49	60
Amounts carried forward		$52,982.89	$49,601

		Cash Payment.	True Cost.
its brought forward		$52,982.89	$49,601.63
WEST MARKET.			
	$9.00		
	9.50		
nob	5.40		
	5.79		
	6.90	36.59	36.59
ARMORY.			
s and hardware	$27.75		
	4.50		
	1.75	34.00	34.00
BRIDEWELL.			
work	$30.38		
	58.57		
	9.56		
	5.00		
	9.62	113.13	113.13
BELL TOWERS.			
		$15.49	15.49
PEST HOUSE.			
ork and hatchet		$14.50	
from city for work	$11.00		3.50
BRIDGE DEPARTMENT.			
ork	$327.81		
nails	268.99		
	136.49		
es and blocks	81.46		
hardware	50.54		
its carried forward	$865.29	$53,196.60	$49,804.34

		CASH PAYMENT.	TRU
Amount brought forward	$865.29	$53,196.60	$49,
Oil, turpentine, etc	155.90		
Hay and oats	70.93		
Chain	25.80		
Miscellaneous	37.65	11,55.57	1,

NORTH AVENUE BRIDGE.

Salary of Tender	$385.00		
Carpenter work	31.12		
Lumber	13.86		
Painting	65.00		
Iron work	3.45		
Coal	3.69	502.12	

CLYBOURNE AVENUE BRIDGE.

On contract for new bridge	$1,000.00		
Salary of Tender	65.00		
Carpenter work	27.50		
Iron work	1.07		
Lumber	6.89		
Painting	35.00		
Building bridge house	20.00	1,155.46	1,

CHICAGO AVENUE BRIDGE.

Salary of Tender	$740.00		
Carpenter work	87.24		
Iron work and tools	25.87		
Lumber	25.04		
Coal	16.86		
Stove and pipe	5.05	900.06	

ERIE STREET BRIDGE.

Salary of Tender	$740.00		
Carpenter work	46.25		
Lumber	36.49		
Coal	11.98		
Iron work and tools	9.10	843.82	
Amounts carried forward		$57,753.63	$54,

		Cash Payment.	True Cost.
Amounts brought forward		$57,753.63	$54,361.37
INDIANA STREET BRIDGE.			
Salary of Tender	$740.00		
Carpenter work	69.99		
Lumber	53.18		
Chain	34.43		
Nails and spikes	4 28		
Coal	7.38		
Iron work and tools	5.62	914.88	914.88
KINZIE STREET BRIDGE.			
Salary of Tender	$875.00		
Carpenter work	64.81		
Iron work	1.82		
Coal	9.88		
Lumber	29.19		
Painting	90.00	1,070.70	1,070.70
RUSH STREET BRIDGE.			
Salary of Tender	$1,105.00		
Carpenter work	227.31		
Iron work	145.58		
Coal	19.62		
Lumber	130.41		
Painting	120.00		
Oil	3.00		
Roofing	13.50		
Damage to horse and buggy	71.38	1,835.80	
Deduct—			
Received for damage to bridge	$43.56		$1,792.24
CLARK STREET BRIDGE.			
Salary of Tender	$1,105.00		
Carpenter work	144.72		
Iron work and tools	19.71		
Bell	25.00		
Coal	12.93		
Lumber	94.94		
Painting	110.00		
Blocks	1.95	1,514.25	1,514.25
Amounts carried forward		$63,089.26	$59,653.44

		Cash Payment.	Tru
Amounts brought forward		$63,089.26	$59,6
WELLS STREET BRIDGE.			
Contract for new bridge	$5,240.00		
Extra work	91.68		
Patent right Nicholson pavement approach	60.00		
Salary of Tender	1,215.00		
Carpenter work	294.00		
Iron work and tools	47.97		
Coal	19.80		
Lumber	293.61		
Piling	11.00		
Dredge work	87.50		
Roofing	38.00		
Painting	42.65		
Stove	5.35		
Repairs of schooner damaged by bridge	18 74	7,465.25	7,
LAKE STREET BRIDGE.			
Salary of Tender	$1,025.00		
Carpenter work	187.68		
Iron work and tools	33.12		
Lumber	111.16		
Painting	110.00		
Piling	11.00		
Coal	7.38	1,485.34	
Deduct—			
Received for damage to bridge	19.00		1
RANDOLPH STREET BRIDGE.			
Salary of Tender	$1,025.00		
Carpenter work	72.32		
Iron work and tools	201.76		
Coal	16.86		
Painting	95.00		
Lumber	6.05		
Damage to vessel	23.00	1,439.99	1
MADISON STREET BRIDGE.			
Salary of Tender	$1,010.00		
Carpenter work	66.25		
Amounts carried forward	$1,076.25	$73,479.84	$70,

		Cash Payment.	True Cost
Amounts brought forward	$1,076.25	$73,479.84	$70,025.02
Iron work and tools	42.80		
Coal	13.43		
Lumber	35.45		
Painting	75.00		
Stove and pipe	5.82	1,248.75	
Deduct—			
Received for damage to bridge	25.00		1,223.75
VAN BUREN STREET BRIDGE.			
Salary of Tender	$1,010.00		
Carpenter work	108.44		
Iron work and tools	4.91		
Coal	17.11		
Lumber	39.85		
Painting	110.00	1,290.31	1,290.31
POLK STREET BRIDGE.			
Salary of Tender	$830.00		
Carpenter work	84.18		
Iron work and tools	55.20		
Coal	13.42		
Lumber	29.48	1.012.28	1,012.28
TWELFTH STREET BRIDGE.			
Salary of Tender	$815.00		
Carpenter work	72.62		
Iron work and tools	17.17		
Coal	7.38		
Lumber	10.04		
Chain	35.63	957.84	957.84
OLD STREET BRIDGE.			
Salary of Tender	$800.00		
Carpenter work	93.73		
Iron work and tools	32.21		
Coal	9.48		
Lumber	32.87	968.29	968.29
Amounts carried forward		$78,957.31	$75,477.49

		CASH PAYMENT.	TRUE (
Amounts brought forward		$78,957.31	$75,47
HALSTED STREET BRIDGE.			
Salary of Tender	$690.00		
Carpenter work	49.99		
Iron work and tools	6.62		
Coal	13.17		
Lumber	28.78		
Painting	90.00	878.56	87
PUMPING AND CLEANSING CHICAGO RIVER.			
Pumping at Bridgeport	$3,686.66		
Analyzing water and expenses survey	160.92		
Use of tug	20.00	3,867.58	3,86
OFFICE EXPENSES AND SALARIES.			
Salaries of Commissioners	$3,749.94		
" Secretary	900.00		
" Engineer	1,800.00		
" Assistant Superintendent	700.00		
" Clerks	3,246.21		
Blank books and stationery	140.04		
Advertising and daily papers	313.59		
Printing	210.95		
Office fixtures and repairs	39.32		
Miscellaneous	94.79	11,194.84	11,19
CHICAGO HARBOR.			
Dredge work	$232.50		
Removing piles	116.50		
Repairs life boats	95.68		
Taking soundings	37.31		
Filling dock at Canal street	10.00		
Removing sunken boats	12.00		
Use of scow	4.00	507.99	50
PUBLIC PARKS.			
Trees, planting and labor on Parks	$455.38		
Iron work on fences	166.25		
Amounts brought forward	$621.63	$95,406.28	$91,92

			CASH PAYMENT.	TRUE COST.
Amounts brought forward		$621.63	$95,406.28	$91,926.46
Stone work on fences		114.50		
Carpenter work		52 50		
Lumber		6.50		
Nails		11.75		
Salary of Superintendent		66.66	873.54	
DEDUCT—				
Grass sold		$10.00		863.54

INTERSECTION OF STREETS.

Paving intersections on Lake street		$7,276.93		
" " South Water street		2,974.29		
Macadamizing intersections on Monroe st.		418.62		
" " North Wells st.		3,277.81		
Graveling " Wabash avenue		240.00		
Paving " Kinzie street		2,326.21		
Macadamizing " Market street		760.11		
Paving and macadamizing intersections on South Wells street		3,031.37		
Grading intersections on West Jackson st.		1.23		
Planking on alley B. 46, O. T.		17.89		
Paving intersections alley B. 17, O. T.		42.97	20,367.43	
DEDUCT—				
Rebate on Monroe street	$80.50			
" Lake "	143.97	224.47		20,142.96
				$112,932.96
Total cash expenditures			$116,647.25	
Balance in hands of City Treasurer, April 1, 1863			30,791.96	
			$147,439.21	

GENERAL FUND.

Amount received by the Board of Public Works, for permits, belonging to the general fund	$377.00	
Amount paid City Treasurer		$377.00

SPECIAL ASSESSMENTS.

LAKE STREET IMPROVEMENT.

Balance unexpended Jan. 1, 1862	$13,261.20	
Old boulders sold De Golyer and McClelland	1,200.00	
Area wall sub Lot 7, Block 16, O. T.	27.55	$14,488.75
Estimates paid De Golyer & McClelland.	$7,754.27	
Extras allowed	72.00	
Rebates on assessment	5,804.15	
Expenses making assessment	329.53	13,959.95
Balance due contractors		$528.80

SOUTH WATER STREET IMPROVEMENT.

Balance unexpended Jan. 1, 1862	$214.39	
Assessment roll for paving South Water st. with Nicholson pavement from Franklin to Lake street	7,035.30	7,249.69
Estimates paid De Golyer and McClelland	6,878.40	
Services Inspector and part expenses of making assessment	236.89	
Short rebate Dec. 5, 1861, on Lot 14, Block 8, Fort Dearborn Addition	2.50	$7,117.79
Balance to apply on expense making assessment		$131.90

MONROE STREET IMPROVEMENT.

Assessment roll for macadamizing Monroe street from Clark to State street		$3,069.48
Estimates paid Danks and Nash	$2,400.00	
Extras allowed Danks and Nash	18.56	
Rebates on Assessment	593.92	
Expenses making assessment	57.00	3,069.48

NORTH WELLS STREET IMPROVEMENT.

Assessment roll for macadamizing North Wells street, from Kinzie street to Green Bay Road		$17,882.85
Amount carried forward		$17,882.85

Amount brought forward		$17,882.85
Estimates paid De Golyer & McClelland	$17,098.18	
Sand and miscellaneous labor	524.67	
Inspecting work	260.00	$17,882.85

KINZIE AND NORTH WATER STREETS IMPROVEMENT.

Assessment roll for paving Kinzie street from Clark to Rush streets, and North Water street, from the east terminus of Kinzie street to the west line of Rush street		$15,882.20
Estimates paid De Golyer & McClelland	$11,500.00	
Rebates on Assessment	370.12	11,870.12
Balance unexpended		$4,012.08

SOUTH CLARK STREET IMPROVEMENT.

Assessment roll for repaving South Clark street from the river to Lake street	$1,025.44
Estimates paid De Golyer & McClelland	1,025.44

NORTH CLARK STREET IMPROVEMENT.

Assessment roll for replanking North Clark street, from the river to New North Water street	$471.00

IMPROVEMENT OF ALLEY IN BLOCK 17, O. T.

Assessment roll for paving alley in Block 17, O. T.		$1,024 00
Estimates paid J. B. Benedict	$365.00	
Extras allowed "	14.13	
Rebates for planking instead of paving	533.00	
Expenses making assessment	111.87	$1,024.00

SIDEWALK IMPROVEMENTS.

Balance unexpended Jan. 1, 1862	$10.00	
Assessment for constructing sidewalk on North side of Illinois street between Butler, Wright and Webster's addition and Kingsbury street	103.40	113.40
Amount carried forward		$113.40

Amount brought forward		$113.40
Rebate to D. W. Mitchell, agent for sidewalk built	95.40	
Part expenses making assessment	10.00	105.40
Balance to apply on expense making assessment		$8.00

SOUTH WELLS STREET IMPROVEMENT.

Rebates on area walls built by owners	$80.58

B. CARPENTER,
FRED. LETZ,
J. G. GINDELE,
Commissioners of the Board of Public Works of the City of Chicago.

STATE OF ILLINOIS,
COUNTY OF COOK, } ss.
City of Chicago.

I, ANDREW J. MARBLE, Clerk of the City of Chicago, in the County and State aforesaid, do hereby certify that Benjamin Carpenter, Frederick Letz, and J. G. Gindele, the above named Commissioners of the Board of Public Works, appeared before me this second day of May, A. D. 1868, and made oath that the foregoing financial statement is true and correct.

A. J. MARBLE, *City Clerk.*

JUL 16 '42

THIRD ANNUAL REPORT

OF THE

Board of Public Works

TO THE

COMMON COUNCIL

OF

THE CITY OF CHICAGO.

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TILDEN FOUNDATIONS

For the Municipal Fiscal Year ending March 31st, 1864.

Tho. L. Forrest,
Acct.

CHICAGO:
JAMESON & MORSE'S POWER PRESS PRINT, 14 LA SALLE STREET.
1864.

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THIRD ANNUAL REPORT

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BOARD OF PUBLIC WORKS,

TO THE

COMMON COUNCIL

OF

THE CITY OF CHICAGO.

APRIL 1st, 1864.

CHICAGO:
JAMESON & MORSE, BOOK AND JOB PRINTERS,
No. 14 La Salle Street, near Lake St.
1864.

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BOARD OF PUBLIC WORKS.

COMMISSIONERS.

JOHN G. GINDELE, PRESIDENT.
FREDERICK LETZ, TREASURER.
ORRIN J. ROSE.
FRANCIS C. SHERMAN, MAYOR,
AND EX-OFFICIO MEMBER OF THE BOARD.

OFFICERS.

A. W. TINKHAM, SECRETARY.
E. S. CHESBROUGH, CITY ENGINEER.

COMMISSIONERS' REPORT.

OFFICE OF THE BOARD OF PUBLIC WORKS,
CHICAGO, APRIL 1, 1864.

To the Mayor and Aldermen of the City of Chicago, in Common Council assembled:

The Board of Public Works respectfully submit herewith their annual report for the fiscal year ending March 31st, 1864.

WATER WORKS.

INCOME.

The total revenue derived during the year amounts, from water taxes, to	$190,841.99
And from profits tapping pipes, to	1,404.40
Total,	$192,246.39

Increase in the amount of water taxes over the receipts of the same for the year previous,	$23,090.77

The Board have continued to add to their number of water meters in use, and with increasingly satisfactory results. It is now a rule with the Board to determine by meters the charge for water for all large consumers. The water tax ascertained by meters, during the last fiscal year, amounts to $23,516.00.

St. Louis Public Library D.E July 16, 1942.

EXPENSES AND REPAIRS.

The expenses of the last fiscal year were as follows, viz.:

Interest on Water Loan Bonds,	$72,033.10
Expenses at the pumping works,	24,619.96
Miscellaneous repairs, including work on new inlet, and water meter repairs and expenses,	10,157.30
Miscellaneous operating expenses, including salaries and office expenses,	22,396.50
Total, interest, expenses and repairs,	$129,206.86

COST OF ADDITIONS TO THE WORKS DURING THE YEAR.

Besides the foregoing, there was expended during the year—

For laying about 13 miles of water pipes,	$75,241.29
For otherwise extending the works, not including lake tunnel,	1,913.35
For lake tunnel—surveys, borings, drawings, etc.,	2,919.62
Total cost of extending works during year,	$80,074.26

PRESENT COST OF WATER WORKS AND HOW PAID FOR.

Cost of the Water Works, April 1st, 1864, including Lake Tunnel,	$1,198,569.23

The means by which the works have been built have been derived as follows, viz.:

Six per cent. bonds outstanding, $1,030,000.00, less $79,384.09 for discount, (the bonds having generally been sold at their seven per cent. par value,)	$950,615.91
Seven per cent. bonds outstanding,	103,000.00
Balance derived from water rents,	144,953.32
	$1,198,569.23

The Board have not found it necessary to issue any bonds since 1861. The income of the works is sufficient to provide for any ordinary enlargement, such as extending the distributing mains, besides paying the interest and expenses.

WATER PIPES LAID.

There have been laid during the year 13 miles and 51 feet of 4, 6, and 8 inch distributing mains, and in the three divisions of the city, as follows, viz.:

South Division, - - - - -	14,286 feet.
West Division, - - - - -	43,082 "
North Division, - - - - -	11,323 "

Total length of water pipes laid during the year, 68,691 ft., or 13 miles and 51 feet.

There are now laid in the city 6 miles and 2,247 feet of supply mains, and 111 miles and 2,694 feet of distributing mains. Total amount laid of water pipes of all sizes, 117 miles and 4,941 feet.

Notwithstanding the amount of water pipes laid during the year was large, as stated above, it still fell considerably short of the amount which the Board were urged to lay, by applicants from all parts of the city. The Board have now before them petitions for supplying streets with water, many of them, too, in pressing need of it, to supply which will require as much as ten miles of pipes; and we are constantly receiving additional petitions. There remain to be delivered, of last year's contract, 140 tons of pipe, and we have ordered a further supply of 400 tons, to be delivered soon after the opening of navigation, which, altogether, will provide for some seven miles of the streets to be supplied. The present cost of the iron, and of the labor and materials generally to be applied in laying the pipes, is, however, so excessive, that an amount of water tax which would warrant, in ordinary times, the putting down of the pipes in a street, will not now pay half the interest on the cost of the pipes and the current expenses. To avoid entailing a heavy, unproductive debt on the Water Works, the Board are compelled to limit the laying of the pipes to such places as are in most urgent need of the water, and where, also, the buildings needing water are most numerous and will yield the greatest amount of water tax. The more than usual demand for the water pipes is one of the consequences of the marked growth of the city during the year.

The Board will, early in the season, invite bids for 500 tons more of pipes, but even with this addition it will be impossible to extend the pipes to many localities for which a supply of water is asked.

LAKE TUNNEL.

The most important event connected with the Water Works, and making a part of their history for the year, is the commencement of work on the tunnel, to be extended out under the bed of Lake Michigan two miles, so that the water will be drawn from the lake that distance from the shore. This project was fully set forth in our last report, and was finally adopted by the Board early last year, as that promising to secure most certainly, and with least expense to the city, its supply of water from a point in the lake where it will not be affected by the discharge from the river, or other impurities from the lake shore.

During the summer, examinations were made along the whole line of the contemplated work, by boring, at short intervals, to the depth proposed for the tunnel, to ascertain the character of the material through which it would pass, and various observations were made to test the quality of the water at the proposed outer end and inlet for the tunnel, and to ascertain also the distance from the shore to which the water of the river reached after certain most marked discharges of the river into the lake. From the borings, it was found that the material through which the tunnel would be built was uniformly clay, and apparently of a firm and even character; and the observations concerning the effect of the river on the lake, showed that,. even when most marked, no trace of its influence could be detected much more than a mile and a quarter from the shore. The information obtained on these and various other points, satisfied the Board that the tunnel would accomplish the results sought for, and that the work was entirely practicable. The necessary drawings and specifications were prepared as speedily as practicable, and advertisements were issued in New York and Boston, as well as here, inviting proposals for the doing of the work. The bids were received and opened Sept. 9th, 1863, most of the parties submitting proposals being present at the opening. The following record describes particularly the bids received:

Bids Received for the Lake Tunnel, September 9, 1863.

NAMES OF BIDDERS.	Lake Tunnel complete	Lake Tunnel and land shaft alone in case there should be two (2) lake shafts.	Lake Tunnel and land shaft alone in case there should be three (3) lake shafts.	Lake Tunnel and land shaft alone in case there should be four (4) lake shafts.	Outer Crib.	One Intermediate Crib.	2d Intermediate Crib.	3d Intermediate Crib.	Each additional foot in height.	Outer Cast Iron Cylinder.	First Intermediate Iron Cylinder.	Second Intermediate Iron Cylinder.	Third Intermediate Iron Cylinder.	Each lb. of increased length or size.
James Andrews,..................... (Pittsburgh, Pa.)	$239,548	$151,987	$148,000	$144,000		$26,021	$23,419	$20,000	$800.00	$14,320*	$11,112	$11,112	$11,112	4 1-5 cts.
James J. Dull & James Gowen, (Harrisburg, Pa.)	$315,139													
Stephen C. Walker, Asa D. Wood, & F W. Robinson,..... (New York.)	$315,000†								$200.00					10 cts.
Thos. Williams, John McBean, A. S. Brown, & George Neilson, (Chicago.)	$490,000‡								$1,250.00	16c ℔ lb.	16c ℔ lb.	16c ℔ lb.	16c ℔ lb.	16c ℔ lb.
Hervey Nash,......................... (Chicago.)	$40 per lineal ft.													
D. L. DeGolyer, ... (Chicago.)	$620,000§	$410,000	$400,000	$380,000 "360,000?"										
William Baldwin, ... (New York.)	$100 per ‖ lineal ft. $1,056,000													

* Included in first general proposal, and would not be contracted for separate. Would deduct from my first general proposition, in case the Board furnish and sink this cylinder, $14,320.

† Meaning to include but one intermediate lake shaft. This proposal is based upon the supposition that the material to be excavated is firm, and such that the tunnel can be made and the masonry built without the use of permanent bracing. But if in the prosecution of the work, to secure its safety, permanent bracing should be required, the attendant increased expenses shall be paid by the City. The Chief Engineer to decide the amount.

‡ For all the work except the iron cylinders for shafts. In case sand or gravel veins occur, to be paid for extra. This sum includes four cribs.

§ I run the risk of all loose earth, sand, or gravel.

‖ $100 per lineal foot, if material is "stiff blue clay soil." If otherwise extra pay and extra time will be required.

The terms in which the first bid of the foregoing list was expressed, were such that, apparently, the bidder did not propose to construct the whole work for a definite sum, and as so understood, it was rejected as indefinite and uncertain. The bid of Messrs. Dull & Gowen, of Harrisburg, Pa., being unconditional, and for the whole work, it was accepted by the Board the day after the reception of the proposals, as the lowest and best bid. Soon after its acceptance, the Board made report of their doings to the Common Council, and requested to be authorized to proceed with the work, and to issue bonds to provide for its cost. The Council granted this desired authority by ordinance of October 5th, 1863. A copy of the contract, as executed at a considerably later day, will be found appended to this report.

Subsequently to the execution of the contract, the Board decided to change the manner of constructing the land shaft, which was originally designed to be wholly of brick, and is so described in the specifications. The change consisted in substituting three cast iron cylinders, each ten feet long, essentially like the iron cylinders proposed for the outer lake shaft, in place of the brickwork of the upper thirty feet of the shaft. This was done to facilitate the sinking of the shaft through the bed of quicksands overlying the clay, the distance through the quicksands to the clay being about twenty-four feet.

The formal breaking of ground took place March 17th last, and the work has been in progress since that time, with occasional interruptions. As was anticipated, a good deal of difficulty has been experienced by the contractors in working through the water and quicksands, but the difficulty has been much less with the iron cylinders than it would have been with brick work, and the clay having been reached, we may reasonably hope that we shall not have serious trouble from this cause hereafter. Of course the work is not sufficiently advanced to enable the Board to form a conclusion as to what rate of progress may be looked for. The time fixed in the contract for the completion of the work, is November 1st, 1865.

Besides the change in the manner of constructing the land shaft, the Board have agreed with Messrs. Dull & Gowen to make certain changes in the outer crib, so that the crib will be stronger than as originally proposed, and so that solid masonry can be eventually substituted for the mass of loose stones with which the crib will be filled. All these changes are described particularly in the copies of the several agreements with Messrs. Dull & Gowen, presented in connection with the appended copy of their contract.

The State legislature had previously given the necessary authority for placing in Lake Michigan any piers to be found necessary for constructing and maintaining the tunnel, but to avoid any question as to the right of the State to make such a grant, the sanction of the United States to the act of the State legislature was obtained, by act of Congress, passed January 16th, 1864, a copy of which will be found appended to this report.

PUMPING WORKS.

It is evident that it will soon be necessary to increase the pumping power of the works. With the view of making timely preparation for this want, the Engineer of the pumping works, Mr. D. C. Cregier, under instructions from the Board, visited last winter all the principal water works of the country where artificial power is used for the elevation of the water, and inspected their machinery. His report, submitted to the City Engineer and embraced in his, contains the views of Mr. Cregier as to the need of another engine, and will be found by you interesting and worthy of consideration.

For a full representation of the state of the water works and of the various operations on the same in progress during the year, as also for similar statements in regard to the sewerage works of the City, we respectfully refer you to the accompanying report to the Board of Mr. E. S. Chesbrough, the City Engineer.

SEWERAGE WORKS.

The report of the City Engineer, already referred to, exhibits so fully the progress and state of the sewers, that we need hardly more than call your attention to it. The amount of work done last year in extending the sewers, was considerably greater than usual. There were built in the three Divisions of the City, during the year, as follows, to wit:

South Division,	7573 ft.	of Sewers of all sizes, costing -	$57,143.08
West "	20407 "	" " " " -	80,719.50
North "	11625 "	" " " " -	32,850.14

Altogether there were built $7\frac{2645}{5280}$ miles of sewers, costing $170,212.72

There are now laid in the City $64\frac{3773}{5280}$ miles of Sewers, distributed thus in the three Divisions:

In the South Division, - - -	26 miles,	1,173 ft.
" West " - - - - -	20 "	4,492 ft.
" North " - - -	17 "	3,388 ft.

The expenditures for the construction of the Sewers amount to date to, - - - - - - $895,369.57

There are outstanding of sewerage bonds:

Six per cent. bonds, - - - - - - -	$87,000
Seven " " - - - - - - -	975,000
Total, - - - - - - - - -	$1,062,000

By the present sewerage law, the proceeds of bonds can be applied only to extending the works. The interest on sewerage bonds, the expenses of cleaning, repairing and maintaining the sewers, all incidental expenses, and the annual provision for the sewerage sinking fund, are paid by the proceeds of the annual tax, termed "sewerage tax." These expenses were last year as follows:

Interest on sewerage bonds,	$67,965.38
Repairs of sewers,	2,058.11
Cleaning of sewers,	5,065.40
Office expenses and salaries,	8,928.98
Sewerage sinking fund,	17,398.75
	$101,416.62

The entire sewerage tax of last year as assessed, amounted to $106,668.31, all of which will be collected and placed to the credit of the sewerage fund, excepting, perhaps, some $1,500.

The sewers throughout the city are in as good repair as usual, and the sewerage system continues to effect, thoroughly the drainage of the districts to which it is extended. As will be seen by the foregoing statement, the annual expenses for cleaning and repairing are comparatively small, and but little exceed those of last year, with a smaller extent of sewers.

The demand for the extension of the sewers, as of the water pipes, has been and is very great. The Board find it quite impossible to gratify the wishes of the property owners and residents of many of the localities where the sewers are petitioned for and needed. We have commenced laying some sewers in various parts of the city, which were included in the contracts of last year, and propose to finish up these contracts as rapidly as possible. It is, however, only with great difficulty that we can just now obtain brick for these sewers. It is the judgment of the Board that in addition to the sewers referred to as contracted for last year, it is not advisable for the city to build many new sewers this year, on account of their present great cost. For any sewers built, bonds must be issued, and for a permanent sewerage debt made for work done now, the city gets an extent of sewers much less than what the same debt would lay in ordinary times. We hence desire to restrict the sewerage extension of this year as much as shall be practicable, and to lay only such sewers as will cause the greatest general benefit.

SEWERAGE SINKING FUND.

The condition of the sewerage sinking fund may be briefly stated as follows, viz:

Cash in the hands of the City Treasurer to be invested as required by the city charter in bonds of the City of Chicago, - - - - - - -	$15,957.55
Due from the sewerage tax of 1863, - - -	17,398.75
Value of three mortgages on real estate in the City of Chicago, - - - - - - - - -	19,021.61
Amount of the sinking fund as above which has not been applied to the extinguishment of sewerage bonds,....	$52,377.91

There have been purchased and canceled of the sewerage bonds, altogether, $58,000, of which amount $20,000 were canceled during the past year.

By the charter, the Board are required to direct as to the investment of the sewerage sinking fund, but are by its provisions confined to the bonds of the City of Chicago for investment.

CHICAGO RIVER.

The condition of the river during the year has been about as it has been for the last two or three years. At times it has been in a very offensive state, nor can it be otherwise so long as it is made the receptacle of the filth of the distilleries, cattle and hog yards, slaughtering establishments and like establishments on its banks, throwing out an immense amount of animal and vegetable offal.

The Board, last year, in their annual report, recommended to your honorable body that as a preliminary work, a covered aqueduct be made through North Street, of twelve feet diameter, connecting the lake and river, and that machinery be erected for forcing sufficient water through this aqueduct to change the water between North Street and the mouth of the river once in twenty-four hours. This pumping could be resorted to as often and continued as long as necessary, and we have every confidence would prevent all offensiveness in the river between its mouth and North Street. We respectfully refer you to that report, pp. 12, 13, and pp. 54–61, and can do no more than to renew the recommendation there made. The estimated cost, as there presented, will now be too small, and it will probably be as much as $200,000.

The Board are of the opinion that this work should be entered upon this season, notwithstanding the present high prices of labor and material. It is so essential to the welfare of the city, that it seems to us not well to defer it.

CHICAGO HARBOR.

The question as to what means shall be taken for improving and preserving our harbor, is one of the utmost importance to the city, demanding the most deliberate and thorough consideration. To secure a safe and direct channel through the bar at the mouth of the harbor, will necessarily require a large expenditure, and to maintain it, it is probable that there must be every year a considerable outlay. But, having determined upon a plan which shall seem best fitted to make the harbor easy and safe of access, and to preserve it in that condition, the improvement should be entered on at once. The prosperity and the very existence of the city depend upon the maintenance of its commercial facilities. It would seem that these improvements ought to be paid for wholly or in part by the general government; but if not so done, they should be undertaken without loss of time, by the city.

Last July it became evident that the existing circuitous channel was becoming obstructed from deposits of sand, and it was feared that the obstruction might become sufficiently serious to hinder the passage of the larger vessels entering or leaving the harbor. With the view of getting a channel, speedily, of sufficient depth, even though it might be but temporary, the attempt was made to dredge out a channel with fourteen feet depth of water across the bar, and between the lines of the north and south piers. As the dredges did not get to work till late in July, and the fall winds commenced soon after, the attempt was not successful, so far as obtaining a channel which could be used last year. The cut was partially made, but has been much filled up by the winter and spring storms. It will be necessary, without doubt, to take measures this present season for opening and maintaining the channel, and we are now making investigations for the purpose of securing some plan for the permanent improvement of the entrance to the harbor, which will be ubmitted to you, when sufficiently matured.

STREETS.

The amount appropriated by the city last year for the streets, was hardly adequate to keep them in a tolerable condition by slight repairs and cleaning. A number of important improvements paid for or to be paid for (excepting the intersections of cross streets and alleys) by assessments on the private property abutting on the street, have been undertaken by the Board during this year, and are completed or in the stage of progress stated hereafter.

NICHOLSON PAVEMENT.

West Lake St. between Halsted St. and the bridge approach.

This important improvement is in progress, and is expected to be completed early this season.

Intersection of Clark and Randolph Sts. Finished.

Intersection of Clark and Madison Sts. Finished.

MACADAMIZING.

Market St., from Madison St. to Van Buren St. Finished.

Canal St., from Lake St. to Fulton St. Finished.

Milwaukee Avenue, from Elston Road to center of North Avenue. In progress, and expected to be finished early this season.

Canal St., from Twelfth St. to S. Br. G. & C. U. R. R. In progress, to be finished soon.

GRAVELING.

North Clark St., from Wells St. to Fullerton Avenue. Finished.

PLANKING.

Alley block 46, original town. Finished.

Alley block 7, Fort Dearborn addition. Finished.

A most important decision relative to the assessments for the improvements of the streets, has lately been rendered by the Superior Court of this city, which, if sustained by the Supreme Court, will effectually stop all street improvements by assessment until a change shall be made in the city charter. The decision is that the manner of making an assessment for the cost of a street improvement, as prescribed in the city charter, is unconstitutional, or, more particularly, that the provision in the city charter, Section 21, Chapter VII, to wit: "Said assessment shall be made in such manner, or as nearly as may be, that each separate block, lot, sub-lot, piece or parcel of land, on either side of the street or part of street to be improved, shall sustain the cost and expense of making and completing the improvement upon that half of the street, directly adjacent to or in front of the same," is in conflict with the provisions of Sec. 5 of the 9th Article of the Constitution of the State of Illinois, thus expressed:

"The corporate authorities of counties, townships, school districts, cities, towns and villages, may be vested with power to assess and collect taxes for corporate purposes; such taxes to be uniform in respect to persons and property within the jurisdiction of the body imposing the same."

The Superior Court has decided in substance that an assessment made in the manner prescribed in the foregoing section of the city charter, is not a special assessment, because it is not made with reference or in proportion to the benefits resulting from the proposed improvement to the property assessed; but that an assessment so made is a tax, within the meaning of Sec. 5, Art. 9, of the State Constitution, and is for a corporate purpose, and being a tax, and for a corporate purpose, and not being uniform in respect to persons and property within the limits of the city, is in violation of the said section of the constitution.

OPENING AND EXTENDING STREETS.

The following street extensions have been consummated during the year:

Dearborn St. Widened from Madison St. to the alley of the Post Office.

Walnut St. Extended through E. ½ block 45, Canal Trustees Sub. of Sec. 7, 39, 14.

Holt St. Extended from Clarinda to Cornell St.

SIDEWALKS

ORDERED BY THE COUNCIL DURING THE YEAR.

SOUTH DIVISION.

E. side	Indiana av. bet. 22d st. and Ridgely place.	Partly laid.
E. side	State st. bet 22d st. and Monterey st.	Laid.
E. side	Michigan av. bet. South Water st. and Chicago river.	Laid.
S. side	Hardin pl. bet. Cottage Grove av. and Douglas av.	Laid.
W. side	Dearborn st. bet. Archer road and South st. (22d)	Laid excepting 30 ft.
N. side	Archer road bet. Halsted st. and Lock st.	Laid.
E. side	Michigan av. bet. 12th st. and 23d st.	Laid 12th to 16th st. and nearly so 16th to 23d st.
W. side	Michigan av. bet. 12th st. and 18th st.	Laid.
W. side	Cottage Grove av. bet. Ridgley pl. and Douglas pl.	In progress.
N. side	Douglas pl. bet Cottage Grove av. and the Lake.	Not laid.
W. side	Ellis av. bet. Douglas pl. and City Limits.	Laid.
B. sides	Indiana av. bet. 14th st. and 22d st.	In progress.
E. side	McGlashen st. bet. 22d st. and Archer road.	Laid.
E. side	Halsted st. bet. 26th st. and Halsted st. bridge.	Laid.
N. side	Douglas pl. bet. Cottage Grove av. and Kankakee av.	Not laid.
W. side	Sanger st. bet. Archer road and Kossuth st.	Laid.
S. side	22d st. bet. Cottage Grove av. and Wabash av.	Laid.
E. side	Wabash av. bet. 22d st. and 24th st.	In progress.
N. side	Douglas pl. bet. Kankakee av. and Forest av.	Not laid.
W. side	Prairie av. bet. Cottage Grove av. and 29th st.	In progress.
S. side	20th st. bet. State st. and Butterfield st.	Laid.
S. side	22d st. bet. Archer road and Grove st.	In prog's—nearly all l'd.
W. side	Wentworth av. bet. 17th st. and 18th st.	In progress.
S. side	17th st. bet. Wentworth av. and Clark st.	Not laid.
N. side	Archer road bet. Lock st. and Reuben st.	Nearly all laid.
E. side	Deering st. bet. Archer road and Cologne st.	Laid in part.
W. side	Main st. bet. Archer road and Cologne st.	In progress.
S. side	Hickory st. bet. Mary st. and Lock st.	Not laid.
W. side	Deering st. bet. Archer road and Lyman st.	In progress.
N. side	Fuller st. bet. Archer road and Cologne st.	In progress.
W. side	Bonfield st. bet. Archer road and Hickory st.	In progress.
S. side	19th st. bet. Clark st. and State st.	In progress.
E. side	Joseph st. bet. Archer road and Hickory st.	In progress.
S. side	Cologne st. bet. Main st. and Fuller st.	In progress.
N. side	Hickory st. bet. Mary st. and Deering st.	In progress.
W. side	Buddan st. bet. Archer road and Alexander st.	Laid in part.
E. side	Wentworth av. bet. 21st and 22d st.	Laid in part.

SIDEWALKS. — CONTINUED.

WEST DIVISION.

S. side	Warren st. bet. Wood st. and Lincoln st.	Laid.
S. side	Warren st. bet. Reuben st. and Paulina st.	Laid.
B. sides	Clinton st. bet. Van Buren st. and Harrison st.	Laid.
S. side	Washington st. bet. Robey st. and Hoyne st.	Laid, excepting 150 ft.
B. sides	Park av. bet. Wood st. and Lincoln st.	Laid. [exc. 100 ft.
B. sides	Park av. bet. Robey st. and Hoyne st.	N. side ld. S. side laid
N. side	Washington st. bet. Wood st. and Lincoln st.	Laid.
W. side	Reuben st. bet. Lake st. and Park av.	Laid.
W. side	Oakley st. bet. Lake st. and Madison st.	Laid.
E. side	Paulina st. bet. Madison st. and Lake st.	Laid.
W. side	Elizabeth st. bet. Lake st. and Randolph st.	Laid.
E. side	Charles st. bet. Van Buren st. and Depuyster st.	Laid.
B. sides	Barber st. bet. Canal st. and Stewart av.	Laid.
B. sides	String st. south from Canalport av.	Laid, exc. 4 lots.
W. side	Hoyne st. bet. Madison st. and Van Buren st.	Not laid.
B. sides	Barber st. bet. Canal st. and Jefferson st.	Laid.
E. side	Jefferson st. bet. Judd st. and Meagher st.	Laid, exc. 4 lots.
S. side	Taylor st. bet. Halsted st. and Desplaines st.	Laid.
B. sides	Newberry st. bet. 12th st. and Taylor st.	Laid.
S. side	Taylor st. bet. Newberry st. and Halsted st.	Laid.
N. side	Monroe st. bet. Rucker st. and Throop st.	Laid.
B. sides	Barber st. bet. Union st. and Halsted st.	Not laid.
W. side	Ann st. bet. Lake st. and Kinzie st.	Laid, exc. 2 lots.
E. side	Loomis st. bet. Van Buren st. and 12th st.	Partly laid.
N. side	Monroe st. bet. Morgan st. and Rucker st.	Partly laid.
E. side	West Water st. bet. Madison st. and Randolph st.	Not laid.
W. side	Ridgeville road bet. Milwaukee av. and North av.	Not laid.
E. side	Jefferson st. bet. Mitchell st. and 22d st.	Not laid.
W. side	Laflin st. bet. Van Buren st. and Taylor st.	Not laid.
B. sides	Coolidge st. bet. Throop st. and Reuben st.	Laid.
W. side	Hoyne st. bet. Washington st. and Park av.	Laid.
N. side	Carroll st. bet. North Ann st. and Elizabeth st.	Laid.
W. side	Noble st. bet. Milwaukee av. and Division st.	Not laid.
N. side	12th st. bet. May st. and Blue Island Av.	Laid.
B. sides	Hubbard st. bet. May st. and Rucker st.	Laid.
W. side	Ada st. bet. Lake st. and Randolph st.	Not laid.
N. side	Rebecca st. bet. Blue Island av. and Rucker st.	Partly laid.
N. side	North av. bet. Elston road and bridge.	Partly laid.
E. side	Elston road bet. North av. and Wabansia av.	Laid.
W. side	Elston road bet. Wabansia av. and Armitage road.	Laid.
W. side	Leavitt st. bet. Kinzie st. and Lake st.	Not laid.
N. side	Washington st. bet. Oakley st. and Western av.	Not laid.
B. sides	Ewing st. bet. Canal st. and Beach st.	Laid, exc. 50 feet.
B. sides	Evans st. bet. Halsted st. and Union st.	Laid, exc. 100 feet.
S. side	22d st. bet. Halsted st. and Reuben st.	Not laid.
N. side	Van Buren st. bet. Sangamon st. and Aberdeen st.	Not laid.
E. side	Aberdeen st. bet. Jackson st. and Harrison st.	Laid.
W. side	Carpenter st. bet. Fulton st. and Kinzie st.	Not laid.
S. side	Catharine st. bet. Blue Island av. and Morgan st.	Partly laid.
N. side	Van Buren st. bet. Throop st. and Loomis st.	Partly laid.
S. side	Carroll st. bet. Wood st. and Robey st.	Laid.
N. side	Jackson st. bet. Rucker st. and Loomis st.	Laid, exc. 4 lots.
E. side	Throop st. bet. Jackson st. and Monroe st.	Not laid.

SIDEWALKS. — CONTINUED.

◆

WEST DIVISION. Continued.

E. side	Peoria st. bet. Randolph st. and Washington st.	Not laid.
B. sides	Kramer st. bet. Union st. and Halsted st.	Laid, exc. 4 lots.
W. side	Holt st. bet. Chicago av. and Cornell st.	Not laid.
B. sides	Catharine st. bet. Canal st. and Jefferson st.	Partly laid.
N. side	Walnut st. bet. Paulina st. and Wood st.	Laid.
N. side	Jackson st. bet. Robey st. and Hoyne st.	Not laid.
N. E. s	Milwaukee av. bet. Reuben st. and Wood st.	Not laid.
W. side	Halsted st. bet. Milwaukee av. and Fourth st.	Partly laid.
S. side	Pratt st. bet. Milwaukee av. and Sangamon st.	Not laid.
N. side	Liberty st. bet. Canal st. and Jefferson st.	Laid, exc. 100 feet.
B. sides	Barber st. bet. Jefferson st. and Union st.	Partly laid.
B. sides	Canal st. bet. Van Buren st. and 16th st.	Not laid.
W. side	Morgan st. bet. Taylor st. and 12th st.	Laid.
N. side	Walnut st. bet. Hoyne st. and Robey st.	Laid.
E. side	Hoyne st. bet. Walnut st. and Lake st.	Not laid.
W. side	Aberdeen st. bet. Taylor st. and 11th st.	Not laid.
W. side	Halsted st. bet 22d st. and the bridge.	Partly laid.
W. side	Robey st. bet. Lake st. and Park av.	Laid.
B. sides	Park av. bet. Lincoln st. and Robey st.	200 feet laid.
S. side	Fulton st. bet. Green st. and Elizabeth st.	Laid, exc. 50 feet.
S. side	16th st. bet. Halsted st. and Rucker st.	Not laid.
N. side	Liberty st. bet. Canal st. and Stewart av.	Laid.
E. side	Elston road bet. Mil. R.R. crossing and North av.	Not laid.
S. side	Post st. bet. Reuben st. and Canal bridge.	Not laid.

NORTH DIVISION.

E. side	Dearborn st. bet. Maple st. and Elm st.	Laid.
S. side	Chicago av. bet. Wells st. and Clark st.	Laid.
B. sides	Whitney st. bet. Green Bay road and Dearborn st.	In progress, partly laid.
S. side	Goethe st. bet. Clark st. and Wells st.	Not laid.
S. side	Erie st. bet. Clark st. and La Salle st.	Laid.
E. side	North Wells st. bet. North av. and Clark st.	Laid.
N. side	Carl st. bet. Wells st. and La Salle st.	Laid.
W. side	Franklin st. bet. Sigel st. and North av.	Laid.
S. side	Divis'n st. fm Market st. to a point op. Clybourne av.	Laid.
B. sides	Vine st. bet. Division st. and Vedder st.	Partly laid.
S. side	Oak st. bet. Clark st. and Wolcott st.	Not laid.
S. side	Superior st. bet. Dearborn st. and Wolcott st.	Laid.
S. side	Whitney st. bet. Wells st. and Franklin st.	Laid.
E. side	Otis st. bet. Division st. and Vedder st.	Partly laid.
B. sides	Grace st. bet. Division st. and Vedder st.	Partly laid.
S. side	Granger st. bet. Wells st. and Sedgwick st.	Partly laid.
W. side	Sedgwick st. bet. Little Fort road and Clark st.	Laid.
W. side	Clark st. bet. Cane st. and Belden st.	Laid.
B. sides	La Salle st. bet. Division st. and North av.	Not Laid.

The foregoing lists represent but a part of the work done on sidewalks. Probably more new walks are built under the orders of the *Board* to "relay," than under the orders of the *Council* directing the construction of walks where there have been none previously.

BRIDGES.

The past year has been one of unusual expenditures under this head, both for repairs of the bridges and rebuilding them.

The most important repair of the year has been on the center protection of Clark Street bridge. This is now being entirely rebuilt, at a cost of about $4,000. As already remarked, the expenditures for repairs on the bridges generally have been unusually large.

On the 3d of last November, the iron bridge crossing the river at Rush Street was accidentally destroyed. This accident was the most serious one of its kind that has ever befallen the city. At the time of its occurrence, a drove of cattle was being driven over the bridge, and a considerable number were on the bridge at the time it was turned. The movements of the cattle on the bridge while it was being turned appear to have caused it to tip, so that two of the six wheels of the turntable sustaining it were crushed. Finally the three trusses were thrown down laterally, and the bridge fell, a mass of ruins, bending and breaking over the center pier, and dropping into the river on either side of the pier. Several persons were on the bridge at the time of the accident, some of whom were thrown into the river, but fortunately no lives were lost. Many of the cattle were caught by the falling trusses, their bodies being jammed in between the iron rods, posts and braces, and others were thrown into the river.

Immediate measures were taken to rebuild the bridge. It was ascertained that to rebuild the iron bridge would take some six months of time, and it was judged best to replace it with a wooden one. As soon as possible, after being properly authorized by you, bids were received for a new bridge, and, November 14th, the work was let to Fox & Howard. During the progress of the work the weather became very severe, but the bridge was opened for foot passengers in January, and soon after for public use. The original cost of Rush Street bridge, including the abutments and piers, is said to have been a little more than $50,000; and the cost of the bridge proper, as destroyed, is supposed to have been about $22,000. The new wooden truss bridge, after deducting for the iron sold from the old bridge, cost $10,175.46.

On the 29th of February last, we had occasion to report to you that Randolph Street bridge was found to be in an unsafe condition, that the chords were rotten, and that the bridge could not long be used without endangering the lives of persons passing over it. Under your instruction the Board have received bids for a new bridge, and have just let the contract to L. B. Boomer, for $4,810. There will be some work to be done not included in his contract, which will make the whole cost of the new bridge, with work to be done on the approaches, about $6,000.

The travel and wear upon the bridges is constantly increasing, and it is evident that the city must be continually adding to the facilities for intercourse between the three divisions of the city. Perhaps at no time during the year was the truth of this statement more generally felt than last fall, after the loss of the Rush Street bridge. The whole traffic across the main river was then thrown on two bridges, those at Clark and Wells Streets, and the wear upon those bridges was so very heavy and incessant, that the Board were continually apprehensive lest one or both of them should receive some material injury, and be thrown out of use.

As long ago as the year 1860, the Council authorized the erection of a bridge across the river at State Street, and the Board have at several times reported to you, recommending its erection as speedily as possible. The most serious difficulty in the way has been that the City has the right of way only on the south side of the river. On the south side, State Street is extended to the river. On the north side, Wolcott street is not extended to the river; there is a small strip of land between the end of the street and the river, owned by the G. & C. U. R. R. Co. Steps have been taken to extend Wolcott Street to the river by assessment and the condemnation of the property, and there have besides been various communications between the Company and the Board with reference to the transfer of the right of way to the City without assessment. It is hoped that the City may speedily get possession of this piece of property needed for the extension of Wolcott Street, and that the bridge will be built early this season.

One way of facilitating the traffic across the river and its branches, will be to replace the old float bridges by pivot bridges. Some of these should be replaced without delay. The bridges at Twelfth Street, Polk Street, Old Street, and Chicago Avenue, ought now to be removed, and pivot bridges substituted for them.

The old bridge across the South Branch at Bridgeport is rotten and unsafe. It should be rebuilt this year, and we shall be obliged to ask for an appropriation for its cost.

PUBLIC BUILDINGS.

The expenditures of the year have been applied mainly to the engine houses.

Early last year the Board contracted for the building of a new brick engine house on West Lake Street—the Island Queen engine house. The contract was for the taking down of the old building, and the erection of the new one. By its terms the new building was to be wholly finished December 1st, 1863. The contractor has quite failed in completing the building, and from being left so long in an unfinished state, the stability of the walls has been endangered. To save the city from loss, we have been obliged to take the work out of the contractor's hands, and have directed the Superintendent to employ other workmen, and finish the building immediately.

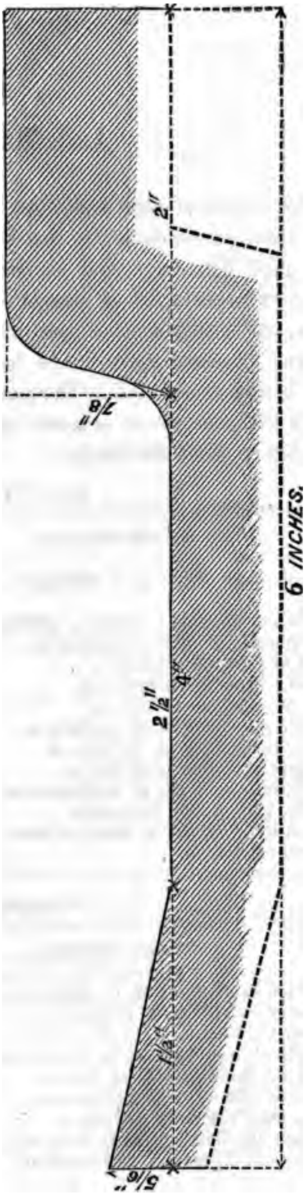
As preliminary steps were being taken for the raising and improving of West Randolph Street, the Board reported to you, last January, that in their judgment the west market building had better be sold and removed. It was of very little public benefit, and was kept in decent condition only at a continually increasing expense. Acting on the report, the Common Council appointed a committee to act jointly with the Board, and your committee and the Board subsequently unanimously agreed to advertise the building for sale and removal. At the appointed time, seventeen different bids were received for the building, ranging from $375 to $1,600. None of these bids were accepted by the Board, and proposals having been again invited, the building was finally sold to Henry Fuller, the highest bidder, for $2,500. It has since been taken down by him and removed.

PUBLIC PARKS AND CEMETERY.

But little was done, during the year, on the parks and cemetery. For the parks of the South and North Divisions no appropriations were made, and the Board have been without the means even of repairing their fences, or of keeping the cattle out of them. For the cemetery the small appropriation of $500 hardly paid the hire of the gate keeper.

FORM OF RAIL FOR HORSE RAILROADS.

In conjunction with a committee of your body, the Board have taken a great deal of pains to determine a pattern for rails to be used on our street railroads, which shall seem best for general adoption throughout the city. The aim was to get a kind of rail which ordinary vehicles could travel along and cross easily, and one which, when laid in a street, should cause the least possible interference with the common use of the street. Inquiries were made as to the kinds of rail in use in other cities, and suggestions founded on their experience were asked for. A good deal of information was thus obtained, and the conclusion finally reached by the Board was, that the best rail for use in our city would be one having a flange four inches wide, on which ordinary vehicles might run, with a rise of not more than seven-eighths of an inch from the flange to the highest part of the rail along which roll the wheels of the horse cars. It was also thought that it would assist in driving out of and across the track to have the inner edge of the rail slightly raised above the flat part of the flange, say five-sixteenths of an inch, the rail being of the form shown by the accompanying sketch. Even with the best form of rail, the track must be maintained in good condition, and level with the surface of the street, or it will become a serious annoyance.



SECTION OF PROPOSED RAIL FOR HORSE RAILROADS.
(Weight about 46 lbs. per yard.)

It may be well to remark, that the gauge of all our horse railroads is 4′ 8½″, and that the distance from outside to outside of the wheels of the most common vehicles, such as buggies and farm wagons, is very nearly the same, averaging, for such vehicles, 4′ 8″.

LAMP POSTS.

The extent of streets lighted by the city was largely increased during the year, particularly in the West Division, where a large amount of new pipe had been laid by the People's Gas Light & Coke Company. We give below a list of streets ordered by you to be supplied with lamp posts, and a statement of the progress made in carrying out the various orders. In some cases lamps have been ordered where there is no gas pipe in the street, and as the gas companies do not appear to be required to lay the pipe where ordered by the city, in such cases it will not be possible to erect the lamps.

SOUTH DIVISION.

WHERE ERECTED.	No. Posts	REMARKS.
Harmon court, State st. to Michigan avenue.	2	No pipe State st. to Wabash av. 1 to be erected.
Prairie av., Monterey (24th) to Buena Vista (25th)	4	Lamps all erected.
Michigan av., B. Vista (25th) to Rio Grande (26th)	5	" "
Grove st., 18th st to 19th st.	4	" "
18th st., State st. to Grove st.	16	Lamps all erected.
Clark st., 12th st. to 18th st.	26	Nothing done. No pipe laid.
Jackson st., Clark st. to La Salle st.	3	" "
Archer road, State st. to Lock st.	66	" "
Michigan av., 18th st. to 22d st.	11	"
Van Buren st., Wells st. to Market st.	7	" "
4th av., 12th st. 400 feet south.	3	"
Indiana av., from 60 ft. south of 25th st. to 60 feet north of 29th st.	10	Assessment being made.

WEST DIVISION.

WHERE ERECTED.	No. Posts	REMARKS.
Aberdeen st., Monroe st. to Adams st.	4	Two lamps erected.
Adams st., Canal st. to Halsted st.	16	Six " "
Warren st., Reuben st. to Robey st.	20	Fourteen lamps erected.
St. John's place, Lake st. to Fulton st.	3	Two " "
Peoria st., Randolph st., to Lake st.	2	Lamps all erected.
Mather st., Canal st. to Jefferson st.	6	" "
Fulton st., Peck st. to Reuben st.	5	" "
Jefferson st., Harrison st. to Polk st.	6	" "
Jackson st., Throop st. to Loomis st.	4	" "

LAMP POSTS.—CONTINUED.

WEST DIVISION. Continued.

WHERE ERECTED.	No. Posts	REMARKS.
Loomis st., Jackson st. to half way bet. Van Buren st. and Tyler st.	6	Lamps all erected.
Sangamon st., Van Buren st. to Tyler st.	5	No pipe in the street.
Taylor st., Canal st. to Jefferson st.	7	Four lamps erected.
Polk st., Canal st. to Foster st.	10	Lamps all erected.
Clinton st., Maxwell st. to Polk st.,	24	" "
Sheldon st., Randolph st. to Washington st.	2	" "
Adams st., Rucker st. to within 250 ft. of Morgan.	8	Seven lamps erected.
Park av., Paulina st. to Reuben st.	4	Lamps all erected.
Lincoln st., Hubbard st. to Fulton st.	10	No pipe in the street.
Lake st., Paulina st. to Leavitt st.	25	
Judd st., Canal st. to Jefferson st.	7	Lamps all erected.
12th st., Clinton st. to Jefferson st.	3	" "
Fulton st., Robey st. to Lincoln st.	3	No pipe in the street.
Wood st., Hubbard st. to Lake st.	14	" "
Hubbard st., Wood st. to Lincoln st.	3	" "
Monroe st., Canal st. to Halsted st.	14	
Canal st., Old (18th) st. to North (16th) st.	7	No pipe in the street.
Old (18th) st., Canal st. to Chicago river.	8	" "
Robey st., Fulton st. to Lake st.	4	" "
Carpenter st., Kinzie st. to Carroll st.	3	Two lamps erected.
Sangamon st., Carroll st. to Fulton st.	2	Lamps all erected.
Carroll st., Halsted st. to Carpenter st.	15	" "
Fulton st., Sangamon st. to Morgan st.	3	" "
12th st., Blue Island av. to Rucker st.	7	" "
Depuyster st., to a point 450 ft. west of Desplaines.	3	" "
Jackson st., Halsted st. to Desplaines st.	5	" "
Carroll st., Halsted st. to Desplaines st.	5	No pipe in the street.
Halsted st., Fulton st. to Milwaukee av.	10	Lamps all erected.
Desplaines st., Harrison st. to 250 ft. north of Adams	16	" "
Van Buren st., Halsted st. to Desplaines st.	4	" "
Price place, Desplaines st. to Halsted st.	4	" "
Throop st., Van Buren st. to Jackson st.	3	Assessment being made.
Washington st., Wood st. to Lincoln st.	4	" " "
West Water st., Kinzie st. to Indiana st.	7	" " "
Willard place, Randolph st. to Washington st.	2	Lamps all erected.
Blue Island av., Maxwell st. to Mitchell st.	6	" "
Van Buren st., Sangamon st. to 175 ft. w. Morgan.	4	" "
Jefferson st., Ewing st. to Polk st.	2	" "
Adams st., from 347 feet west of Throop st. to Laflin	7	No pipe in the street.

NORTH DIVISION.

WHERE ERECTED.	No. Posts	REMARKS.
Oak st., Green Bay st. to Lake Michigan.	3	Nothing done.
Chicago av., Rush st. to Pine st.	1	Lamp erected.
N. Dearborn st., Maple st. to Division st.	4	Two Lamps erected.
Chicago av., Wolcott st. to Green Bay st.	6	Lamps all erected.
Cass st., Superior st. to E. Hinsdale.	5	Nothing done.

ACCOUNTS.

We present herewith various financial statements, showing in detail all the expenditures, and the cost of the various operations conducted by the Board during the year.

Respectfully submitted.

J. G. GINDELE,
FRED. LETZ,
O. J. ROSE,
F. C. SHERMAN.
Board of Public Works.

REPORT OF CITY ENGINEER.

CHICAGO, April, 1864.

To the Board of Public Works:

GENTLEMEN—The City Engineer herewith respectfully presents this, his third annual report.

WATER WORKS.

These are generally, with regard to repairs and efficiency, in as good a condition as they were a year ago—in some respects better.

PUMPING WORKS.

The condition and performance of these, during the past year, will be found fully described in the following report of the engineer in charge of them.

REPORT OF ENGINEER OF PUMPING WORKS.

ENGINE HOUSE PUMPING WORKS,
CHICAGO, April, 1, 1864.

E. S. CHESBROUGH, ESQ., City Engineer:

SIR:—Agreeable to the usual custom, I herewith present a statement of the operations of this department for the year ending March 31st, 1864.

On the 24th of November last the water was shut off for the purpose of cleaning the pump well, which occupied about three hours. During this time the reservoirs were full of water, and watchmen were stationed at each for the purpose of opening the gates in the event of a fire occurring in the city. With this exception, the supply of water to the city has been constant throughout the past year.

The quantity pumped during the year just closed amounts to 2,336,108,454 U. S. gallons, and exceeds the quantity pumped the previous year 118,828,715 gallons.

Of the whole amount delivered, the

Large engine pumped	1,177,627,536 gals.
Small do do	1,158,480,918 "
Being an average daily quantity of	6,382,810 "

The following tabular statement exhibits the aggregate operation of both engines, etc., during the past year:

MONTHS.	Average Gallons Water pumped per day.	Total Gallons Water pumped per month.	Average ℔s. of Coal consumed per day.	Total ℔s. of Coal consumed per month.
1863.				
April,	5,783,989	173,519,952	15,309	459,288
May,	6,229,656	193,119,348	15,567	482,590
June,	6,475,190	194,255,701	14,881	446,458
July,	6,752,667	209,332,677	15,508	480,750
August,	7,018,136	217,561,920	14,722	556,393
September,	7,240,989	217,229,652	17,484	524,538
October,	5,989,613	185,678,001	17,955	456,618
November,	5,871,086	176,132,600	13,655	409,660
December,	6,438,474	199,592,696	15,774	488,995
1864.				
January,	6,770,451	209,884,992	17,389	539,088
February,	6,072,022	176,088,647	14,725	427,050
March,	5,926,202	183,712,268	14,313	443,715

THE FOLLOWING TABLE SHOWS THE QUANTITY OF WATER PUMPED EACH MONTH,

From January 1st, 1858, *to March 1st*, 1864, *inclusive.*

MONTHS.	1858.	1859.	1860.	1861.	1862.	Months.	1863.	1863-4.
January, ..	81,538,179	106,905,665	132,284,454	137,651,918	151,971,047	April,	....	173,519,952
February, .	69,426,515	106,401,412	130,800,720	142,071,067	168,931,783	May .	....	193,119,348
March, ...	82,677,463	102,415,983	150,331,680	135,576,447	192,937,942	June,	....	194,255,701
April, ...	82,600,782	89,994,235	132,930,546	128,371,178	170,081,570	July, .	....	209,332,677
May, ...	82,279,920	116,007,263	141,171,078	150,489,168	181,483,032	Aug .	....	217,561,920
June, ...	90,211,505	113,098,416	148,197,024	155,996,352	199,113,518	Sept .	....	217,229,652
July, ...	101,670,736	133,800,336	166,394,640	147,182,793	209,215,872	Oct. .	....	185,678,001
August, ...	107,176,652	123,266,556	152,427,690	168,602,494	195,588,295	Nov. .	....	176,132,600
September.	108,534,540	131,735,847	132,272,202	152,710,186	186,902,888	Dec. .	....	199,592,696
October, ...	101,046,605	141,527,040	148,710,195	149,362,166	199,045,045	Jan. .	169,900,255	209,884,992
November, .	86,385,840	127,342,018	150,493,248	153,879,648	187,002,720	Feb. .	158,108,450	176,088,647
December, .	98,316,722	122,653,139	130,773,075	145,261,272	175,006,027	Mar .	159,930,404	183,712,268
TOTAL, ..	1,091,865,457	1,415,147,910	1,716,786,552	1,767,154,689	2,217,279,739		487,939,109	2,336,108,454

NOTE.—The operating year is now (1863) from first of April.

THE AVERAGE DAILY QUANTITY PUMPED FOR THE ABOVE YEARS, WAS:

1858,	2,991,412 galls.	1861,	4,841,547 galls.
1859,	3,877,118 "	1862,	6,074,739 "
1860,	4,703,525 "	1863–4,	6,382,810 "

THE PUMPING ENGINES

Have been in use a portion of every day during the past year.

The large engine has been in operation 179 days, an average of 15$\frac{10}{60}$ hours per day.

The small engine 187 days, an average of 18$\frac{03}{60}$ hours per day.

The actual running time amounts to 6,099$\frac{24}{60}$ hours.

The whole amount of coal received during the year was 3,694$\frac{1430}{2000}$ tons, in addition to 173$\frac{590}{2000}$ tons on hand April 1st, '63, making a total of 3,868$\frac{20}{2000}$ tons. Of this amount 2,857$\frac{1143}{2000}$ tons were consumed for pumping, 124$\frac{250}{2000}$ tons for keeping steam when the engines were at rest, 148$\frac{1175}{2000}$ tons for pipe laying, workshop, inlet, heating engine house, &c.; making a total for all purposes of 3,130$\frac{568}{2000}$ tons; and leaving on hand, April 1st, '64, 759$\frac{1080}{2000}$ tons.

The following tables will show in detail the operations of engines, pumps and boilers during the past year:

LARGE ENGINE.

MONTHS.	No. of Days run.	No. of Hours and Minutes run.	Av. No. of Hours run per day.	Av. galls. of water pumped per day.	Total galls. water pumped per month.	Pounds Coal consumed for pump'g	Pounds Coal consumed when at rest.	Total Coal used pr month.	Total Revolutions per month.
1863.		H. M.	H. M.						
April,................	30	420 41	14 01	5,783,989	173,519,952	459,288	27,500	486,788	212,647
May,................	20	293 44	14 41	6,185,973	123,719,472	317,970	17,100	335,070	151,617
June,................	5	66 14	13 15	5,586,825	27,934,128	69,580	3,100	72,680	34,233
July,................	5	73 55	14 47	6,559,499	32,797,488	82,590	3,900	86,490	40,193
August, ...	31	501 15	16 10	7,018,136	217,561,920	556,393	24,000	580,393	266,620
September,.........	21	342 50	16 19	7,614,640	159,907,440	387,973	15,100	403,073	195,965
December, ...	28	402 36	14 22	6,395,079	179,062,224	443,195	26,500	469,695	219,439
1864.									
January, ...	31	467 30	15 04	6,770,451	209,884,992	539,088	27,300	566,388	257,212
February,...........	8	117 09	14 38	6,654,990	53,239,920	135,140	6,500	141,640	65,245
TOTALS,.........	179	2,685 54	14 48	6,467,192	1,177,627,536	2,991,217	151,000	3,142,217	1,443,171

SMALL ENGINE.

MONTHS.	No. of days run.	No. of hours and Minutes run. H.	M.	Av. No. of Hours run per day. H.	M.	Av. galls of water pumped per day.	Total galls. water pumped pr month.	Pounds Coal consumed for pump'g.	Pounds Coal consumed when at rest.	Total Coal used per month.	Total Revolutions per month.
1863.											
May,	11	216	21	19	40	6,309,079	69,399.876	164,620	4,800	169,420	133,770
June,	25	490	32	19	37	6,652,862	166,321,573	376,878	10,600	387,478	320,589
July,	26	496	35	19	06	6,789,814	176,535,189	398,160	10,500	408,660	340,276
September,	9	166	12	18	28	6,369,134	57,322,212	136,565	4,600	141,165	110,490
October,	31	556	56	17	57	5,989,613	185,678,001	456,618	15,900	472,518	357,899
November	30	510	15	16	42	5,871,086	176,132,600	409,660	17,500	427,160	339,500
December,	3	57	02	19	00	6,843,490	20,530,472	45,800	2,550	48,350	39,573
1864.											
February,	21	367	50	17	31	5,849,939	122,848,727	291,910	12,300	304,210	236,794
March,	31	551	46	17	47	5,926,202	183,712,268	443,715	18,500	462,215	354,110
TOTALS,	187	3,413	30	18	25	6,195,085	1,158,480,918	2,723,926	97,250	2,821,176	2,233,001

RECAPITULATION.

ENGINES.	No. of Days.	No. of Hours and Minutes. H.	M.	Total galls. water pumped.	Pounds Coal consumed for pump'g	Pounds Coal consumed when at rest	Total pounds of Coal used.	Total No. of Revolutions.
Large.	179	2,685	54	1,177,627,536	2,991,217	151,000	3,142,217	1,443,171
Small,	187	3,413	30	1,158,480,918	2,723,926	97,250	2,821,176	2,233,001
TOTAL,	366	6,099	24	2,336,108,454	5,715,143	248,250	5,963,393	3,676,172

The actual expenses due to pumping during the past year were as follows:

Salaries of engines and firemen	$ 5,445.88
3,043 $\frac{710}{2000}$ tons of coal for pumping, heating engine house, &c. at an average of $6.53 per ton	$19,879.74
229 gallons oil	211.09
843 pounds tallow	89.92
Packing, waste, etc	185.71
Gas for lighting works	144.43
Repairs to machinery	40.86
Total	$25,997.63

Cost of delivering water per million gallons	$11.72

The engines and boilers are in as good condition as circumstances will permit. Nothing more than the usual repairs by the regular employees has been done during the past year, with the exception of slight repairs upon the "North Boiler," costing $6.53, and the completion of the foot-walks around the small engine, costing $340.72; this latter work, however, is not properly repairs.

There are some important parts of the large engine which require repairs. These will receive attention as soon as the parts can be procured. Owing to the peculiar arrangement of the works, it has been deemed best to replace some of the parts needing repairs with new ones. A new steam piston has therefore been ordered, and will be connected early the coming year. The old piston, when repaired, will be fit for use hereafter.

The purpose for which these engines were erected is of such vital importance to the community, that no effort should be spared to secure them beyond the probability of failure. For it is upon the pumping works that the city is almost wholly dependent for a supply of water. This becomes apparent when the fact is taken into consideration that the reservoirs are of such limited capacity they would be of little service in the event of an accident to the engines. However, as there are two independent engines, it would seem that there is sufficient security against a contingency of the kind. No doubt this was the object in view of those who designed the works, since it was intended to use but one engine at a time, the other to be kept as a reserve.

The past ten years have fully demonstrated the wisdom of this arrangement. But are the measures heretofore relied upon, adequate for the future? Perhaps a brief review of the operation and condition of the engines, may aid to determine the question. It will be recollected the small engine has been in use for ten years; during this time but little repairs have been found necessary, and its performance has been every way satisfactory. Thirteen revolutions per minute is the limit to which this engine was designed to run. At that rate, for twenty-four hours, about nine and a half millions gallons of water could be pumped.

During the past year it was found necessary to run this engine several days, over eleven revolutions per minute for twenty-four hours per day, and during one day over twelve revolutions per minute were made for nineteen hours, and the quantity of water required to be pumped, reached seven and a half million gallons per day. Thus it will be seen the nominal maximum capacity of this engine is nearly reached. Although these requirements during the past year were an exception, yet with a reasonable increase in the consumption of water during the next two years, they will certainly become the rule. And to impose upon machinery a greater duty than it was designed for, is generally a hazardous experiment. This would seem especially true where a whole community are dependent upon the successful operation of it, as is the case with our pumping engines.

The capacity of the large engine is fully equal to the demands, but as previously stated, repairs are needed which will require several days to complete, during which, the small engine is the only reliance. It is not apprehended that anything will occur to prevent making these repairs, or interrupt the supply of water. It is alluded to simply to show the necessity that exists for additions, to render the works more reliable. Much more might be submitted upon this subject, but perhaps a comparison of these works with other works of like character, will make it sufficiently apparent.

In nearly all cities where the supply of water is obtained by means of pumps, there are two or more independent engines, each of a capacity to supply the demand. *In addition* to these, there are one or more *immense reservoirs*, containing sufficient water to supply several days or weeks, without using the machinery; thus affording ample time to make important repairs, and thereby render the works reliable.

And notwithstanding these comparatively great sources of security, it will be found, by referring to the various water works reports, that those on whom the duty devolves are continually recommending improvements and additions to their respective works which may tend to insure an abundant and reliable supply of water to their citizens. It therefore seems clear, by the comparison, that either the measures adopted in most cities for a reliable supply are unnecessarily great, or the facilities Chicago at present possesses are insufficient.

It will be borne in mind that our city has *no great reservoir;* it is this important adjunct, or its *equivalent*, that is required to render our pumping works equal in efficiency to any in the United States, for I know of no engines in operation of a more reliable character than those of our own works.

It is obvious, then, that a new engine and pumps will soon be indispensable, *not* as a substitute for either of the present ones, but to increase their usefulness, and also to render the probability of failure less liable. If this be admitted, then the important questions to be decided are, what shall be the general plan of engine and pumps? and, (perhaps the most important one at this time,) where can machinery of the character required be procured? for it is well known that most of the large foundries in the country are fully occupied with work for the United States government. It may therefore prove a very unfavorable time at present to secure work of the kind. However, I respectfully suggest that the matter receive an early consideration, as much time will be required to thoroughly consider plans for the construction and introduction of new machinery, and when perfected, it is hoped no difficulty will be then experienced in obtaining favorable propositions for its construction.

With this view, and in order that the Board might avail themselves of the experience of others, should additional machinery be deemed necessary, they instructed me to visit a number of pumping works in eastern cities, for the purpose of procuring such information pertaining to the subject as might assist them to determine upon the most desirable plan for a thorough and economical engine and pumps. Accordingly, during the latter part of the year just closed, I visited the pumping works of Jersey City, Brooklyn, Cleveland, Philadelphia, Harrisburg, Detroit, and other places, and was enabled to make observations and gain information which may prove advantageous in the preparation of plans, etc.

In this connection, I desire to avail myself of the present opportunity to acknowledge my obligations to the gentlemen connected with the works above mentioned, also to H. R. Worthington and M. Coryell, of New York City, and R. W. Hamilton, of Hartford, for the very kind manner in which they extended to me every facility to obtain the information sought for.

THE BUILDINGS

Of the pumping works are in as good condition as usual. The repairs recommended by you last year were deferred, as additions may be required hereafter which will involve considerable alterations, including that portion requiring repairs.

The recent improvement of the grounds, in front of the buildings, remain permanent. The trees, grass, etc., together with the substantial iron fence and stone sidewalk, render them both attractive and ornamental.

THE WORKSHOP,

Established two years ago, has, during the past year, given further practical evidence of its usefulness, not only in the quality and quantity of the work "turned out," but in a pecuniary sense.

During the past year, 131 new fire hydrants have been manufactured, besides a number of old ones repaired. Eighty-six stop valves have also been made, of various sizes, as follows:

49 four inch,
30 six inch,
5 eight inch,
2 twelve inch.

In addition to these, 261 feet of wrought iron fence has been constructed for the West Reservoir lot, and a large amount of repairing done for the various bridges and sundry city departments.

The total expenditures for labor and material during the year amount to - - - - - -	$7,524.19	
Add for interest, wear and tear, etc., - -	275.00	
Value of work as above, based on prices formerly paid for like articles, - - - - - -		$11,260.13
Leaving balance in favor of shop of - -	3,460.94	
	$11,260.13	$11,260.13

Five new hydrants, seven new 6-inch stop valves, one new 8-inch stop valve, and two new 12-inch stop valves remain on hand. The value of the above, including the raw material on hand, amounts to

	$1,451.43
Value of shop tools, etc., - - - - - - - - -	1,719.00
Total, - - - - - - -	$3,170.43

The stores and tools belonging to pumping works are about the same as at date of last report, except those remaining from what were purchased during the past year, which amount to $156.23. Among the property remaining at the pumping works, is the non-condensing pumping engine formerly used for supplying this city. This engine is horizontal, substantially constructed. The steam cylinder is eighteen inches diameter and six feet stroke. The water pump is double-acting, and same size as steam cylinder. Connected to it are all the necessary steam, exhaust, suction, and delivery pipes, cocks, valves, etc., etc., making it complete (except boilers) to supply 50,000 people with water. Slight alterations will render this engine available for any purpose where a steam engine of its power may be required. As the city has no further use for it, it might be disposed of at a low figure. I therefore respectfully suggest that it be offered for sale.

No change has been made in the force employed in this department during the past year. It affords me pleasure to state that the assistant engineers, fireman, and others, are entitled to credit for the manner in which they have discharged their various duties.

Respectfully,

DEWITT C. CREGIER, *Engineer.*

Mr. Cregier's opinion relative to the importance of immediately taking measures to get up plans for a new engine, the necessity for which he has mentioned, both by stating the fact that the reliable maximum capacity of our small engine must in all probability soon be reached, and by referring to the experience and works of other cities, is worthy of serious consideration.

It will be seen, from Mr. Cregier's tables, that the average annual increase of consumption since 1858, has been 559,752 gallons. The greatest number of gallons pumped by the small engine on any day since April 1st, 1863, was 7,554,045 gallons. If the small engine should be worked at a speed of thirteen revolutions per minute for 24 hours, it would deliver 9,714,936 gallons, showing that in less than four years we are likely to reach a point when we may occasionally be obliged to work the small engine at a greater speed than was guaranteed by the contractors for the small engine when new—ten years ago.

There are other reasons, however, why no time should be lost in getting up plans for another engine, beyond what is necessary for a judicious investigation of the merits of different forms and proposed improvements. The most important are, first, the *possibility* that one of the engines may break or some of its parts fail, while the other is undergoing ordinary repairs or overhauling; under such circumstances the city must necessarily be deprived of water for at least two days. Accidents may be caused by influences outside of the pumping works, and over which the engineer has no control, such as the sudden bursting of a large main. Other cities provide against such a contingency by constructing large reservoirs, at suitable elevations, but our circumstances are such that we shall probably never have a reservoir sufficient to hold two days' supply within the limits of the city, for the reason that such a reservoir would cost at least five times as much as new pumping works, and would not be half their value to the city. The second reason is, the uncertainty that the future increase of consumption and waste can be kept within the limits experienced during the past three years. The average daily amount of water pumped during the year exceeds that of the year before by only 308,071 gallons, while the increase in population and the consequent causes of consumption have been greater than usual. This result is no doubt owing very much, if not wholly, to the more thorough examination of the premises of water tenants, and the consequent prevention of waste from them; to the large number of leaking fire hydrants that have been taken out and renewed or repaired; and to the further extension of the use of meters.

THE BASIN.

The breakwater around the basin shows considerable deterioration, and may soon require very extensive repairs or partial renewal.

DISTRIBUTING PIPES.

There have been laid, during the year ending March 31, 1864, the following distributing pipes, viz.:

SOUTH DIVISION.

ON WHAT STREET.	BETWEEN WHAT STREETS.	Diamet'r in inches	Length in feet.
Wabash avenue	Twenty-fourth and Twenty-second	6	825
Butterfield	Eighteenth and Nineteenth	4	441
Twenty-first	Clark and State	8	798
Michigan avenue	Twenty-second and northward	6	299
State	Twenty-third and Twenty-fourth	8	363
Michigan avenue	Twenty-fifth and Thirty-first	6	3,302
Thirty-first	Michigan avenue and Cottage-Grove avenue	6	2,707
Grove	North street and northward	4	287
North	Indiana avenue and Prairie avenue	4	483
Archer road	Halsted and Main	6	2,537
Polk	Clark and State	8	846
Hubbard	Michigan avenue and State	8	855
State	Hubbard court and Polk	8	316
Wentworth avenue	Alexander and southward	4	373
	Hydrants	4	134
	Total		14,566
	The 4 inch pipe on Polk street, between Third and Fourth avenues was taken up when the 8 inch main was laid last year		280
	Difference		14,286

DISTRIBUTING PIPES.—CONTINUED.

WEST DIVISION.

ON WHAT STREET.	BETWEEN WHAT STREETS.	Diamet'r in inches	Length in feet.
Washington	Wood and Lincoln	4	710
Maxwell	Jefferson and Newberry	6	1,601
Twelfth	Canal and Union	8	1,624
Morgan	Hubbard and Kinzie	4	371
Jefferson	Hubbard and Indiana	4	379
Morgan	Harrison and Polk	8	300
Harrison	Morgan and Morgan	8	140
Morgan	Polk and Taylor	8	1,086
Twelfth	Canal and Lumber	6	1,133
North	Union eastward to end of pipe laid last year	6	1,106
Union	North and northward	4	129
Jefferson	North and southward	6	50
Reuben	Chicago avenue and Cornell	6	666
Chicago avenue	Carpenter and Reuben	6	3,649
Holt	Chicago avenue and northward	4	48
Rose	Chicago avenue and northward	4	47
Noble	Chicago avenue and northward	4	49
Chase	Chicago avenue and northward	4	46
Rucker	Chicago avenue and northward	6	52
Wright	Jefferson and Halsted	6	1,344
Canal	Canalport avenue and Old street	6	142
Old	Canal and eastward	6	482
Cornell	Reuben and Rose	4	1,017
Rose	Cornell and Front	4	357
Front	Reuben and Rose	4	1,018
Holt	Front and northward	4	193
Rucker	Jackson and Adams	4	250
Throop	Jackson and Tyler	6	888
Mather	Halsted and eastward	4	437
Arthur	Old and Irwin	4	476
Irwin	Canal and Arthur	4	324
May	Polk and Twelfth	4	1,726
Newberry	Maxwell and Wright	4	893
Twelfth	Blue Island avenue and Rucker street	8	937
Rucker	Twelfth and southward	6	50
Mitchell	Stewart avenue and eastward	4	418
Barber	Canal and Stewart avenue	4	566
Meagher	Canal and Stewart avenue	4	537
Lincoln	Park avenue and Lake street	6	345
Lake	Lincoln and Leavitt	4	2,019
Lumber	Twelfth and Maxwell	4	779
Canalport avenue	Seward and Jefferson	6	618
Jefferson	Canalport avenue and Lumber	6	1,483
Lumber	Jefferson and Union	4	1,165
Fulton	Peck and Reuben	4	745
St. John's place	Fulton and Lake	4	276
Fulton	Morgan and Curtis	4	660
Curtis	Lake and Fulton	4	404

Amount carried forward **33,735**

DISTRIBUTING PIPES.—CONTINUED.

WEST DIVISION. Continued.

ON WHAT STREET.	BETWEEN WHAT STREETS.	Diamet'r in inches	Length in feet.
	Amount brought forward	......	33,735
Ewing	Jefferson and Halsted	4	1,308
Beach	Polk and Taylor	4	859
Union	Barber and Catharine	4	458
Robey	Lake and Walnut	4	327
Peoria	Hubbard and Milwaukee av	4	983
Indiana	Milwaukee avenue and eastward	4	543
Pratt	Milwaukee avenue and Sangamon	4	563
Sangamon	Milwaukee avenue and Pratt	4	521
Sangamon	Kinzie and Prairie	4	477
Curtis	Hubbard and Kinzie	4	400
Foster	Harrison and Polk	4	865
Hope	Blue Island avenue and Morgan	4	688
Better	Sholto and May	4	560
Carpenter	Chicago avenue and Front	4	360
	Hydrants	4	435
	Total		43,082

NORTH DIVISION.

ON WHAT STREET.	BETWEEN WHAT STREETS.	Diamet'r in inches	Length in feet.
Division	Halsted and Larrabee	6	1,320
Halsted	Division and Rees	4	1,010
Elm	Green Bay and eastward	4	220
Pearson	Franklin east of Wells	4	672
Sigel	Sedgwick and Hurlbut	4	650
Otis	Division and Vedder	4	507
Goethe	Wells and Clark	4	838
Huron	Wolcott and Cass	6	376
Huron	Townsend and Kingsbury	4	393
Erie	Wolcott and Cass	4	374
Halsted	North avenue and Willow	6	1,080
Willow	Halsted and westward	4	238
Burling	Willow and North avenue	4	1,087
Elm	Wells and eastward	4	263
Whiting	Franklin and west of Market	4	638
Green Bay road	Asylum place and Cane street	4	365
Cane	Green Bay road and westward	4	281
Vine	Division and Vedder	4	483
Ontario	Market and westward	4	460
	Hydrants	4	68
	Total		11,323

The total length of pipe laid in the whole city during the year was 13 miles and 331 feet. The length taken up was 280 feet.

The total length of pipe of different sizes, in the city, as near as can be ascertained, is as follows, viz.:

24	inch	cast iron main pipe, - - - - -	12,265	feet.
16	“	“ “ - - - - -	10,610	“
12	“	“ “ - - - - -	9,830	“
30	“	wrought iron river pipe, State street, -	280	“
24	“	“ “ Chicago avenue,	236	“
24	“	“ “ Rush street, -	530	“
12	“	“ “ Adams street, “	176	“
12	“	cast iron distributing pipe, - - -	364	“
10	“	“ “ - - - -	7,862	“
9	“	wrought iron distributing and siphon pipe, Archer road, - - - - -	90	“
8	“	cast iron distributing pipe, - -	47,318	“
6	“	“ “ - - -	199,725	“
4	“	“ “ - - - -	303,027	“
3	“	“ “ - - -	30,388	“
			622,701	feet.

or 117 miles and 4,941 feet.

It will be seen, from the above statement, that there is a greater length of 4-inch pipes than of all larger sizes put together. It was found advisable, years ago, to lay no more 3-inch pipes; and if the experience of other cities, as well as our own, with regard to the supply of fire engines, should be carefully considered, it may be found best to lay a much smaller proportion of 4-inch pipes in future. With iron at ordinary prices, the saving, by laying 4-inch instead of 6-inch pipes, is only thirty cents a running foot, while the efficiency, when new, of a 4-inch pipe is less than one-half that of a 6-inch pipe; but when old and partially filled with tubercles or deposits, its capacity for delivering water is frequently diminished to one-third that of a 6-inch pipe equally affected with tubercles or deposits.

HYDRANTS.

During the year, the following new hydrants have been put in, viz.:

SOUTH DIVISION.

1 Cregier, N. W. corner Twenty-first and State.
1 “ N. E. “ Thirty-first and Michigan avenue.
1 “ “ “ “ Indiana avenue.
1 “ “ “ “ Calumet avenue.
1 “ “ “ “ Myrick avenue.

WEST DIVISION.

1 Cregier, N. W. corner Lincoln and West Washington.
1 “ N. side Maxwell between Jefferson and Union.
1 “ N. W. corner Kinzie and Morgan.
1 “ N. E. “ Harrison and Morgan.
1 “ N. W. “ Twelfth and Canal.
1 “ “ “ Union and North.
1 “ N. E. “ Chicago avenue and Reuben.
1 “ “ “ “ Holt.
1 “ “ “ “ Noble
1 “ “ “ “ Chase.
1 “ N. W. “ “ Rucker.
1 “ “ “ Throop and Van Buren.
1 “ “ “ “ Tyler.
1 “ “ “ May and Twelfth.
1 “ West side May, opposite Damon.
1 “ N. W. corner Stewart avenue and Meagher.
1 “ N. E. “ Lake and Robey.
1 “ “ “ “ Hoyne.
1 “ N. W. “ “ Leavitt.
1 “ Engine House, north side Jackson bet. Clinton and Jefferson.
1 “ “ “ Blue Is. av. bet. Harrison & Gurley.
1 “ N. W. corner Desplaines and Ewing.
1 “ “ “ Peoria and Indiana.
1 “ S. W. “ Sangamon and Pratt.
1 “ N. W. “ “ Kinzie.
1 “ “ “ Curtis and Kinzie.
1 “ S. W. “ Carpenter and Front.
1 “ North side Cornell opposite Rose.
1 “ West side Reuben “ Cornell.
1 “ N. E. side Beach “ Ewing.
1 “ S. E. side Beach “ Taylor.

NORTH DIVISION.

1 Cregier, N. E. corner Sigel and Hurlbut.
1 “ “ “ Huron and Kingsbury.
1 “ N. W. “ Halsted and Willow.
1 “ N. E. “ Division and Pleasant.

In all 40, making the total number in and belonging to the city at this time, 548.

Sixty-three hydrants were taken out and renewed, all with Cregier's; besides these, twelve other hydrants received more or less repairs.

About one hundred hydrants have been connected with the sewers in such a way as not only to drain off waste and leakage from them, but to let warm air from the sewers circulate around them. Although the operation of thawing out hydrants was performed 334 times last winter, but one hydrant that was connected with the sewers was frozen, and that was owing to the drain pipe having been obstructed. This is satisfactory evidence of the importance of continuing this work as far as the sewers have been built.

STOP COCKS.

The following stop cocks have been put in during the year, viz.:

SOUTH DIVISION.

1 W. Wks. shop 8 in., Clark, south side of Twelfth.
1 " 8 in., Twenty-first, east side of Clark.
1 " 6 in., Archer road, west side of Halsted.
1 " 4 in., Prairie avenue, south side of North.
1 " 8 in., Polk, east side of Clark.

WEST DIVISION.

1 W. Wks. shop 4 in., West Washington, west side of Lincoln.
1 " 4 in., Morgan, north side of Kinzie.
1 " 8 in., Morgan, south side of Taylor.
1 " 6 in., Jefferson, south side of North.
1 " 6 in., Reuben, north side of Chicago avenue.
1 " 4 in., Holt, " "
1 " 4 in., Rose, " "
1 " 4 in., Noble, " "
1 " 4 in., Chase, " "
1 " 6 in., Rucker, " "
1 " 6 in., Wright, west side of Halsted.
1 " 4 in., May, south side of Polk.
1 " 6 in., Maxwell, west side of Halsted.
1 " 6 in., Rucker, south side of Twelfth.
1 " 4 in., Park avenue, west side of Lincoln.
1 " 4 in., Lake, west side of Lincoln.

STOP COCKS.—CONTINUED.

WEST DIVISION. Continued.

1 W. Wks. shop 6 in., Lincoln, north side of Park avenue.
1 " 4 in., Polk, north side of Beach.
1 " 4 in., Sangamon, north side of Kinzie.
1 " 4 in., Curtis, north side of Kinzie.
1 " 4 in., Carpenter, north side of Chicago avenue.

NORTH DIVISION.

1 W. Wks. shop 4 in., Larrabee, north side of Division.
1 " 4 in., Halsted, north side of Division.
1 " 4 in., Pearson, west side of Wells.
1 " 4 in., Otis, north side of Division.
1 " 4 in., Erie, east side of Wolcott.
1 " 6 in., Halsted, north side of North avenue.
1 " 6 in., Illinois, west side of Wells.
1 " 4 in., Indiana, west side of Wells.
1 " 4 in., Ohio, west side of Wells.
1 " 4 in., Burling, North avenue.
1 " 8 in., Chicago avenue, west side of Wells.
1 " 4 in., Chicago avenue, west side of Wells.
1 " 4 in., Franklin, south side of Chicago avenue.
1 " 4 in., Sedgwick, south side of Chicago avenue.
1 " 4 in., Chicago avenue and Larrabee (blow off.)
1 " 4 in., Vine, north side of Division.
1 " 4 in., Erie, west side of Wells.

In all 45, and, together with those previously put in, making a total of 298 in the city.

Two stop cocks were repaired, and 23 were entirely renewed by others made at the water works shop, making the total number of stop cocks made at our own shop, and in actual use on the 1st day of April, 1864, 125—of which seven are 8 inch, forty-one are 6 inch, and seventy-seven are 4 inch.

WORKSHOP.

The work done here, and the estimated saving by it to the city, have already been mentioned by Mr. Cregier. This very satisfactory result, however, does not embrace all the advantages derived from the workshop, for without it the probability is that the supply of new districts, last season, would have been very much retarded for the want of hydrants and stop cocks, which, owing to the unprecedented demand for all kinds of iron work, could not have been procured in time from the usual source, after it became known they would be wanted.

RESERVOIRS.

The repairs of the south reservoir, mentioned in the last annual report, have proved to be entirely successful, in preventing leakage from its bottom, which was formerly so troublesome.

The other reservoirs leak a little more than they used to, but it will not require much labor to repair them, as the principal difficulty appears to be around the ends of some of the tie-rods.

QUALITY OF THE WATER.

This has been pretty good during the year, except for a short time during the packing season. Since then, owing to the frequent rains, no complaints have been made of bad water. Should we have continued dry weather during the next summer or fall, or very cold weather and no rain next winter, a recurrence of this evil may be expected. Of the plans proposed for remedying it, the Board have, after much careful investigation, adopted

THE LAKE TUNNEL.

Owing to many delays, of various character, the breaking of ground for this work did not take place till the 17th of last month. On that day the work was formally commenced. The iron cylinders, which had been ordered by the Board to protect the land shaft against an influx of very wet sand and gravel known to overlay the clay for about twenty feet, did not arrive till after upwards of two months of detention. The progress since then has been much less than was expected, owing to the troublesome nature of the sand and gravel just mentioned; but the hard clay has been reached, and there is every encouragement now to believe that the work will proceed without serious hindrance from the land shaft. The crib for the outer lake shaft, is to be commenced next. Contractors have made arrangements for the iron cylinders for this, and most of them have already been cast in Pittsburgh. A portion of the timber for the outer crib is expected in a few days, and the remainder as fast as needed.

In order that nothing of importance in connection with the crib or the gates for controlling the entrance of water into the tunnel, after it is completed, might be omitted, a visit to New York, Boston, and Philadelphia was made in January last, for the purpose of getting further information, and of advising with Mr. Erastus W. Smith, Chief Engineer of the new Harlem Bridge, and the consulting Engineer of the Board for the Lake Tunnel. As usual on such subjects, respectable authorities differed materially as to whether our plans should be modified or not, and if so, how. The general impression made was that our own lake experience was more valuable for our purposes than that of the seaboard, or even that of the European coast, so far as it could be learned from parliamentary and other documents. Some suggestions, however, with reference to strengthening the crib, have been partially adopted, and changes for this purpose, which will add to the cost of the outer crib.

These changes have been made principally for the purpose of being able to replace the loose stones, to be used in weighting the crib, with solid masonry. It should perhaps be mentioned here that the octagonal form of crib, recommended in the report of last year, has given place to the pentagonal form, as being simpler to build, and having angles easier to strengthen.

The cylinder for the outer shaft has been made heavier than was at first recommended. This was done at the suggestion of Mr. Smith, who furnished the plans and specifications for the cylinders embraced in the contract for the tunnel. Mr. Smith has since had plans of the inlet gates for the outer shaft, prepared in detail. These have required much study, as it is necessary that the gates shall be repaired, whenever they may need it, without shutting off the water from the city.

Much has been said with regard to the propriety of making the tunnel six feet in diameter, instead of five, and if the material through which it is to be made should be stiff clay, as there is every reason to believe it will be, there would be no difficulty whatever in making the tunnel even larger.

The reason for recommending a smaller size, was to make the success of the work as certain as possible, in case the most difficult kinds of soil should be met with. To the examples taken from Minard, in his account of tunnels in France, may be added that of the small drift under the Thames, before the commencement of the great tunnel afterwards completed there. A short notice of this drift will be found on page 42 of the last annual report, and those mentioned by Minard on page 44. A consideration of these cases show the much greater ease with which it is possible to construct a small tunnel than a large one, through difficult soil.

A six-feet tunnel two miles long would deliver, under the different heads of 2, 8, and 18 feet, 29,000,000; 58,000,000; and 87,000,000 gallons daily. The corresponding quantities for a five feet tunnel would be 19,000,000; 38,000,000; and 57,000,000 gallons. The velocities would be, for the above quantities, through a five feet tunnel, $1\frac{4}{10}$, $2\frac{8}{10}$, and $4\frac{2}{10}$ miles an hour; and through a six feet tunnel, 1, 2, and 3 miles an hour.

Supposing, then, that the city had a population of 1,000,000, requiring an average daily supply to each inhabitant of fifty-seven gallons, the six feet tunnel would furnish it with a head of eight feet and an average velocity of two miles an hour, while a five feet tunnel would require a head of eighteen feet, and a velocity of four and one-fifth miles an hour; showing a very decided advantage in favor of the six feet tunnel, which it would certainly be worth considerable to secure, in view of the probability of the future rapid growth of the city. It should be remembered, however, that there is a *possibility* of meeting with some difficult places; and that the tunnel, if completed as now specified, would furnish, with a head of eight feet, water enough to supply a population of two-thirds of a million with fifty-seven gallons daily for each inhabitant, or a whole million with the same quantity for each inhabitant, with a head of eighteen feet.*

METERS.

Mr. O. F. Woodford, the Water Assessor, reports the following meters as being now in use:

27, $\frac{5}{8}$-inch,
36, 1-inch,
27, 2-inch,
9, 3-inch.

Whole number, 99, all of which are Worthington's patent.

The favorable results obtained from those already in use, continue to justify their rapid extension.

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* At the time of going to press, July 7th, the land shaft has been completed; also, about 240 feet of the tunnel, which is five feet in diameter. The rate of progress in June was about eight feet a day. The outer crib has been very much delayed for the want of timber, but will, it is hoped, be put in place next month.

SEWERAGE.

In consequence of other duties requiring so much of the time of the City Engineer, the principal Assistant has performed nearly all labors connected with the general charge of the construction and superintendence of sewers, and his full reports and suggestions below are submitted as sufficient and satisfactory under this head.

CHICAGO, MARCH 31, 1864.

To E. S. CHESBROUGH, ESQ., *City Engineer:*

SIR—The following report will show the various operations of the Sewerage Department, during the year ending April 1, 1864.

The amount of work in this department, during the past year, exceeds that done for several years past, and amounts to 39,605 lineal feet = 7$\frac{2645}{5280}$ miles of sewers built. The following tabular statements show the length of the different size sewers built during the year in the three districts, and the total lengths of the same, in the three districts, built up to April 1, 1864, and the number of catch basins and man holes.

LENGTH IN FEET OF SEWERS BUILT TO APRIL 1, 1864.

	SOUTH DISTRICT.		NORTH DISTRICT.		WEST DISTRICT.		
Diameter in feet.	Previous to April, 1863.	From April 1, 1863, to Ap'l 1, 1864.	Previous to April, 1863.	From April 1, 1863, to Ap'l 1, 1864.	Previous to April, 1863.	From April 1, 1863, to Ap'l 1, 1864.	TOTAL FEET.
6	567	852	3,895		1,292		6,606
5	361	1,286	4,761	3,746	17,090	8,372	35,626
4½			2,721		8,795	4,762	16,278
4	1,952		5,498		5,786	755	13,991
3	13,605	2,143	3,828	331	818	795	21,520
2½	19,478	2,811		2,284			24,573
2¼	6,359						6,359
2	20,258		35,143	3,764	31,634	3,373	94,172
1	68,300	481	25,677	1,500	24,270	2,350	122,578
	130,880	7,573	81,523	11,625	89,685	20,407	341,693
Totals,	138,453		93,148		110,092		64$\frac{3773}{5280}$ miles.

CATCH BASINS AND MAN HOLES.

	Built from April 1, 1863, to April 1, 1864.			Previously Built.	Total.	Average Cost in 1863 & 1864.
	South Dis.	West Dis.	North Dis.			
Catch Basins,.	17	103	72	1,304	1,496	$43.15
Man Holes,...	44	90	71	2,201	2,405	

RETURN OF SEWERS BUILT AND REPAIRS OF SEWERS, FOR THE YEAR ENDING APRIL 1, 1864.

LOCALITY.	CONSTRUCTION.									REPAIRS.			
	6 Feet.	5 Feet.	4½ Feet.	4 Feet.	3 Feet.	2½ Ft.	2 Feet.	1 ft. Pipe	C Basins	L ft. Sewers repaired.	No Bas. rep.	Bas. etc. alt to grade.	Covers rep. and rene'd.
SOUTH DISTRICT.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	No.				
22d st., Calumet to Indiana av...	852												
22d st., Indiana av. to State......		1,286											
22d st., State to Clark					877								
Michigan av., 12th to 14th					1266								
Michigan av., 14th to 16th						1406							
Indiana av., 22d to line of 19th..						1405							
16th, Prairie av. west...............								397					
Alley B 10 Ft Dear Ad. sewer ex								84					
Totals in South District...	852	1,286			2143	2811		481	17	21	3	24	180
WEST DISTRICT.													
Harrison st., river to Halsted...		3,016											
Twelfth st., river to Halsted.....		3,379											
Maxwell st., river to Canal.......		1,977											
Fulton st., Peck to Reuben			674										
Adams st., 216 ft. w of Aberdeen to 306 ft. w of Throop			1,418										
Twelfth st., Halsted to Rucker..			2,670										
North st., Stewart av. to river...				355									
Reuben st., Fulton to Lake				400									
North st., Jefferson to Union.....					795								
Sheldon st., Fulton te Lake							448						
Peck st., Fulton to Lake..........							440						
Rucker st., Adams to Monroe...							486						
Canal st., Twelfth to Judd.......							311						
Canal st., Wilson to Wright......							1222						
Canal st., Meagher to all'y south							240						
Union st., North to alley north..							226						
Jefferson st., Hubbard to Indi'na								302					
Monroe st., Rucker east								491					
Green st., Monroe to Jackson ...								893					
Canal st., Judd to Wilson.........								255					
Canal st., Wright to Meagher...								409					
Totals in West District...		8,372	4,762	755	795		3373	2350	103	78	4	42	75
NORTH DISTRICT.													
Market st., Erie to Division......		3,526											
Division st., Market to Sedgwick		220											
Division st., Sedgwick to Cly. av					331								
Chicago av., river to Market.....						1728							
Wolcott st., Chi. av. to Hinsdale						556							
Wolcott st., Hinsdale to White..							314						
Division st., Market to Wells.....							796						
Hinsdale st., Market to Frank'n							406						
Elm st., Green Bay to Dearborn							369						
Pearson st., Green Bay to Cass..							253						
White st., Wolcott to Dearborn							438						
Chicago av., Market to La Salle							1188						
La Salle st., Erie to Chicago av.								949					
Franklin st., Hinsdale south.....								146					
Dearborn st., Elm north..........								135					
Alley B 3 Bush'lls Ad. n Chi. av								270					
Totals in North District...		3,746			331	2284	3764	1500	72	30	2	16	31
GRAND TOTALS...	852	13,404	4,762	755	3269	5095	7137	4331	192	129	9	82	286

There remain to be executed contracts for building the following sewers, and which are now in progress. In the South District, 4,360 feet of 2½ feet sewers, and 3,960 feet of 2 feet sewers. In the West District, 3,770 feet of 2 feet sewers. And in the North District, 1,240 feet of 2 feet sewers.

The average cost of the sewers built during the past year has been considerably greater than of those built in 1860, but less than that of those built in 1856, as is shown below:

6 ft. sewers per lin. ft., 1856,	$5.76.	In 1860,	$2.88.	In 1863,	$0.00
5 ft. " " " "	5.39.	"	2.44.	"	4.66
4½ ft. " " "				"	4.67
4 ft. " " " "	5.75.	"	2.20.	"	4.27
3 ft. " " " "	3.19.	"	1.45.	"	4.09
2½ ft. " " "				"	3.24
2 ft. " " " "	1.66.	"	92.	"	1.72
1 ft. Pipe, " " "	1.20.	"	70.	"	94

The following sewers being exceptional in their cost, on account of the depth of cutting and the quantity of water to be contended with, are not included in the above average:

6 ft. sewer on 22d st., from the Lake to Indiana av., cost per ft.		$14.60
5 ft. " " " Indiana av. to State st.,	" "	10.73

It is proper to state that the increased cost of the sewers built during the last year, over the cost of those built in 1860, is due in some degree to the increased depth of cutting and the wet bottom in which many of the former have been built. The chief cause, however, is the enhanced prices of labor and material.

For filling over new sewers to protect the same on streets not previously raised to grade, there has been expended, for teams and labor, during the past year:

On North Market street, - - - - -	$1,514.49
On West Twelfth street, - - - - - -	181.25
Total, - - - - - - -	$1,695.74

For altering the position of 2,274 linear feet of water pipes from the lines of the sewers and their connections, there has been expended $550.50.

CLEANSING OF SEWERS.

The following table shows the length in feet of sewers cleansed during the year, and the cost of the same by the different methods required for the various sizes of the sewers. It will be seen that the cleansing by the use of the flushing wagon is much the cheapest, but that mode is not applicable to the larger sewers, nor to the removal of compacted sand.

CLEANSING SEWERS AND CATCH BASINS, AND COST OF SAME.

METHODS OF CLEANSING.	South District.		West District.		North District.		Totals lin. ft. clea'd.	R'te of cost ⅌ 100 ft.
	Lin ft. clea'd.	Cost.	Lin ft. clea'd.	Cost.	Lin ft. clea'd.	Cost.		
Flushing Sewers with Tank..........	42,600	$676.13	12,000	$126.77	25,300	$502.35	79,900	$1.63
Removing deposits from main Sewers by Scrapers and Barrows......	50	58.95	32,300	704.53	16,500	266.63	48,850	2.11
Cleansing Sewers with Chain Machine......................................	3,100	387.03	....	....	4,800	649.49	12,900	8.03
Cleansing Catch Basins by hand....	No. of 911	807.67	No. of 591	589.79	No. of 432	354.05	No. of 1934	Each. 90c
Totals of Cost.......................		$1,929.78		$1,421.09		$1,772.52	$5,123.39	

COST OF CLEANSING FOR PREVIOUS YEARS.

1859, $1,971.59 1860, $5,619.48 1861, $5,474.03 1862, $4,793.35

More cleansing has been required during the past year than usual, on account of the necessity of thoroughly cleansing the new sewers, and also because of the soft condition of the streets in the winter of 1862–3, the usual amount of flushing with the large tank could not then be done.

COST OF REPAIRS.

There has been expended, during the year, in the three districts, for repairs of sewers and catch basins, for altering man holes and catch basin covers to suit changes of grade of the streets, and for the renewal and repairs of covers for the same, as follows: In the South District, $720.19; in the West District, $619.13; in the North District, $310.53; Total, $1,649.85. Of this amount, $1,220.95 is due to repairs of 208, and renewals of 78, man hole and catch basin covers. Many of these covers have been in use for seven or eight years, and extensive renewals will soon be required. It is probable that it will be found desirable, from considerations of economy as well as of safety, to replace the movable part of the man hole covers with iron, on the streets which are permanently improved, and where the traffic is heavy.

SUBSOIL DRAINAGE.

The superior efficacy of the single ring brick sewers over the pipe sewers, for subsoil drainage, continues to manifest itself. The pipe sewers are sufficiently large for many localities, and have the advantage of being more easily flushed out than the brick sewers of large size, but they do not relieve the soil from the water with which it is saturated in the wet season, in those parts of the city where there is a bed of sand resting upon clay. In such situations brick sewers are to be preferred on that account.

PRIVATE DRAINS.

The following table shows the number of Permits issued for connexions with the sewers for private drains during the year, and the total number of connexions up to April 1st, 1864. These drains have been inspected, and plates made of their positions in the lots, which are now being copied upon the plans in the office.

PERMITS FOR PRIVATE DRAINS ISSUED IN 1863 AND 1864.

PART OF THE CITY.	6 inch Drain.	9 inch Drain.	12 inch Drain.	Total in 1863–64.	Total previously laid.	Total to Apl. 1, 1864.
South District,.....	204	9	4	217	....	....
West District,.......	169	26	2	197	....	....
North District,.....	108	11	3	122	....	....
Totals,........	481	46	9	536	2,802	3,338

Two hundred and twenty-two private drains have been ordered to be put in by the Common Council, upon the recommendation of the Board, and of these one hundred and fifty-seven have been put in by the owners of the lots, and two have been put in by the Board, and the cost of the latter remains to be collected by special assessment on the lots drained. The remaining sixty-three drains were deferred on account of the approach of winter.

The annual soundings of the depth of water in the river and branches, show that the usual water way has been maintained, and that there has been no filling up on account of the deposits from the sewers.

Which is respectfully submitted,

WILLIAM H. CLARKE,
Prin. Assistant City Engineer.

CONDITION OF THE RIVER.

With the exception of two or three weeks, during the packing season, last year, the condition of the river has generally been bearable; but the causes which render it offensive are increasing every year, and it only needs a long period of drought to make it intolerable.

With regard to the means for remedying this state of things, very little, if anything, pointing to permanent and constant relief can be added to the suggestions and recommendations which will be found on pages 54 to 61 of the last annual report, except to state that any estimates of cost made then are not applicable to the present state of things. At least fifty per cent., if not more, should be added to them.

Respectfully submitted,

E. S. CHESBROUGH,

City Engineer.

FINANCIAL STATEMENT.

Trial Balance, Ledger, Board of Public Works, March 31, 1864.

WATER DEPARTMENT.

	Dr.	Cr.
Water Works	$1,195,649.61	
Water Works Income		$1,125,785.38
Water Loan Bonds, 6 per cent		1,030,000.00
Water Loan Bonds, 7 per cent		103,000.00
Water Loan Interest	524,811.59	
Water Expenses and Repairs	379,062.97	
Discount on 6 per cent Water Loan Bonds	79,384.09	
Water Fund in hands of City Treasurer	6,531.72	
Water Pipes	12,382.82	
Water Works Stock	13,474.80	
Water Works Coal	5,619.70	
Water Works Service Cocks	206.16	
Duncan, Sherman & Co., (Coupon acc't)	37,130.00	
Water Works Work Shop	3,822.28	
R. D. Wood & Co., (Water Pipe acc't)		2,209.98
Lake Tunnel	2,919.62	
	$2,260,995.36	$2,260,995.36

WATER FUND.

STATEMENT of the Cash Receipts by the Board of Public Works from April 1, 1863, to March 31, 1864, inclusive; and detailed statement of the cost of the various operations conducted by the Board during the same time:

RECEIPTS.

Water Tax Collected	$190,885.99		
Receipts for shutting off and letting on water,	169.25		
" for tapping pipes	4,225.35		
" for sale of pipes, coal, materials and work	818.30		
" for laying pipes and putting in hydrants on private premises	197.64		
Steam Engine sold	625.00		
Received from L. Crawford damages for non-fulfillment of coal contract	1,977.57	$198,899.10	
ADD—			
Balance in hands of City Treasurer March 31, 1863		23,235.07	
			$222,134.17

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EXPENDITURES.

ADDITIONS TO WATER WORKS.

IMPROVEMENT OF GROUNDS AROUND PUMPING WORKS AND RESERVOIRS.

		CASH PAYMENT.	TRUE COST.
Trees, $28; Pickets engine house fence, $23.55	$51.55		
Lumber, nails, etc., for sidewalk	115.08		
Paint'g fence, $83.32; Labor on grounds, $111.80	195.12		
Building fence, nails, lumber, etc	53.98		
Hauling and filling	123.37		
Labor and lumber for engine house park	38.59		
Iron for west reservoir fence	541.59		
Labor, nails, etc	67.96		
Carpenter's work on fence	44.00		
Ten cords stone	55.00	$1,286.24	
ADD—			
Work at shop on engine house fence	30.76		
Work at shop on west reservoir fence	385.87		
	$416.63		$1,702.87
NEW ENGINE.			
D. C. Cregier's traveling expenses examining latest improv'ts,		210.48	210.48
Amounts carried forward		$1,496.72	$1,918.35

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$1,496.72	$1,913.35
DISTRIBUTING PIPES LAID.				
Cast Iron pipes, 4, 6, and 8 inch		$33,141.10		
Testing and laying pipes		4,709.64		
Trenching and back filling		8,807.76		
Lead		5,398.83		
Rent of testing yard		313.61		
Repairs of testing press		34.62		
Hauling pipes		907.41		
Caps, sleeves, and small castings		1,539.68		
Hydrant and stop cock boxes		656.98		
Dockage on 147 tons of pipe		36.75		
Rebuilding aprons, culverts, etc.		102.00		
Repairs service pipes		18.59		
Lead pipe in Kinzie street purchased of Gal. & Chi. Railroad Co.		502.74		
Cost of patent right for use of fire hydr'ts,		500.00		
Plumbing work at pipe yard		126.99		
Lumber for shed		98.16		
Coal		91.08		
Miscellaneous		324.08	57,310.02	
ADD—				
Pipes used, previously paid for		$16,213.57		
New hydrants put in		783.26		
New stop cocks put in		826.50		
Work on press and tools at shop		203.60		
Oil used		7.90		
Repairs caulkers' tools at shop		94.89		
		$18,129.72		
DEDUCT—				
Amount received for hydrants put in, work done, and pipes laid for private parties	$145.95			
Scrap iron sold	52.50	198.45		
		$17,931.27		75,241.29
Total addition to cost of Water Works			$58,806.74	$77,154.64

WORKING EXPENSES AND REPAIRS.

EXPENSES AT THE PUMPING WORKS.

		CASH PAYMENT.	TRUE CO
Salary of Engineer and two assistants	$3,178.37		
Foreman and laborers	2,295.88		
Coal, $2513\frac{1225}{2000}$ tons	16,986.00		
Oil, 288½ gallons	273.19		
Tallow, 843 lbs	91.30		
Packing, $26.47 ; Gas burners $6.25	32.72		
Brass rail for engine	226.46		
Hardware, stove and castings	98.32		
Carpenter work, painting and lumber	45.32		
Gas, $144 83 ; Cotton waste, $158.86	303.69		
Weighing and stowing coal	131.62		
Fittings for engine	18.79		
Hay	29.93		
Repairs buggy	13.50		
Miscellaneous	42.17	$23,767.26	
ADD—			
$191\frac{1590}{2000}$ tons coal previously paid for	$661.68		
Work done at shop	244.92		
	$906.60		
DEDUCT—			
Oil used	53.90		
	$852.70		$24,619.

MISCELLANEOUS OPERATING EXPENSES.

Wages, caulkers and laborers on hydrants, stop cocks, etc	$3,827.70		
Tools and hardware	21.60		
Carpenter work, lumber and nails	261.69		
Hay, feed and oats	505.45		
Watching reservoir and inlet	390.76		
Horse shoeing	20.52		
Harness and repairing	39.05		
Building catch basins for hydrants	1,014.33		
Repairing streets, $156.87 ; Trenching, $42	198.87		
Sand, stone and gravel	95.50		
Wagon and painting	36.89		
Drain pipe, brick, cement and covers for catch basins	293.23		
Resetting telegraph cable and work at North Reservoir	43.31		
Miscellaneous	167.44	$6,916.34	
Amounts carried forward		$30,683.60	$24,619

			Cash Payment.	True Cost.
Amounts brought forward			$30,683.60	$24,619.96
Add—				
Work done at shop on tools		$3.59		
Oil used		10.50		
Depreciation, horses, wagons, etc.		140.00		
		$154.09		
Deduct—				
Receipts shutting off water, etc.	$169.25			
Sand sold and work done	74.75	244.00		
		89.91		6,826.43
REPAIRS.				
Reservoirs—				
Laying bottom South Reservoir,	$350.00			
Brick for furnace	6.40			
Repairing sidewalk	9.00			
Glazing and hardware	50.50	$415.90		
Hydrants and Stop Cocks—				
Labor	$2,232.82			
Carpenter work	227.41			
Hay, feed and oats	29.85			
Lumber	58.58			
Brick work $16.50; Cement $24.50	41.00			
Repairing streets	97.50			
Flag stone	8.82			
Trenching and back filling	13.50			
Miscellaneous	29.50	2,738.98	3,154.88	
Add—				
Work at shop on hydrants and stop cocks,		$61.87		
Hydrants substituted		1,233.65		
4-inch stop cocks used		102.33		
6-inch stop cocks used		132.13		
Depreciation in shop fixtures, old hydrants and stop cocks		320.49		
		$1,850.47		
Deduct—				
Old iron sold from South Reservoir		27.84		
		$1,822.63		4,977.51
Amounts carried forward			$33,838.48	$36,423.90

			CASH PAYMENT.	TRUE COS
Amounts brought forward..			$33,838.48	$36,423.9
CONSTRUCTING NEW INLET.				
Labor		$776.62		
Carpenter work		129.50		
Lumber		568.06		
Coal		18.00		
Repairing pile driver		31.24		
Use of pile driver		257.33		
Use of steam pump		440.00		
Mason work and cement		90.83		
Spikes, nails and tools		52.35		
Miscellaneous		154.07	2,518.00	
DEDUCT—				
Lumber used	$6.20			
Sand sold	6.00			
	$12.20			2,505.8
WATER METERS.				
33 meters, freight, fittings, etc		$3,132.88		
Repairs		634.47		
Lumber		36 12		
Setting		404.80		
Plumbing		100.74		
Carpenter work		27.60		
Labor, $116.25; Trenching, $19.50		135.75		
Miscellaneous		37.97	4,510.33	
DEDUCT—				
Valuation meters, charged stock,	$2,831.00			
Plumbing, etc., paid back	39.44	$2,870.44		
ADD—				
Work at shop	$5.10			
Depreciation on meters	1,029.00	1,034.10		
		$1,836.34		2,673.9
OFFICE EXPENSES AND SALARIES.				
Salaries, Commissioners		$2,499.96		
Salary, Secretary		616.66		
Salary, City Engineer		1,200.00		
Salary, City Superintendent		475.01		
Amounts carried forward		$4,791.63	$40,866.81	$41,603.6

		CASH PAYMENT.	TRUE COST.
Amounts brought forward	$4,791.63	$40,866.81	$41,603.69
Salaries, Clerks	2,672.90		
Salaries, Water Assessor and Collectors	5,133.33		
Salaries, Draughtsmen	1,097.50		
Labor, care of office, etc	274.74		
Blank books, stationery, binding and printing,	876.05		
Advertising	229.50		
Newspapers, $8.33 ; Scientific books, $27.76,	36.09		
Office furniture and repairs	73.88		
Expenses horse keeping and repairs buggy, etc., (Assessor)	82.30		
City maps, printing same, and tracing paper,	75.33		
Entering addition to city atlas	100.00		
Miscellaneous	127.16	15,570.41	
ADD—			
Work at shop for office	11.91		
DEDUCT—			
Expenses refunded	12.25		
			15,570.07
	34		
Total operating expenses		$56,437.22	$57,173.76

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WORK SHOP.

Labor		$1,808.42	
12 hydrants		300.00	
Hydrant castings and bolts		2,194.10	
Brass castings		775.15	
Brass wire		96.95	
Iron, steel and hardware		634.83	
Coal, $324.11 ; Lead, $100.11		424.22	
Roofing, $23.65; Leather, gaskets, etc., $65.42		89.07	
Miscellaneous		58.72	$6,381.46
DEDUCT—			
Cash receipts for work	$197.04		
Amount charged repairs	1,529.98		
Amount charged tunnel	50.84		
Amount charged engine house improvement	275.68		
Amount charged improvement for West Reservoir fence	385.87		
Amount charged meters	5.10		
Amounts carried forward	$2,444.51		$6,381.46

			CASH PAYMENT.	TRUE COST.
Amounts brought forward....	$2,444.51		$6,381.46	
Am't charged distributing pipes,	1,647.27			
Am't charged service cocks....	17.20			
Am't charged miscellaneous....	251.13	$4,360.11		
ADD—				
Oil used..........................		35.50		
		$4,324.61		$2,056.85
INTEREST.				
Interest on Water Loan Bonds, July 1, 1863, and January 1, 1864..................		$69,010.00		
Commissions to Duncan, Sherman & Co.....		171.78	$69,181.78	
ADD—				
Am't transferred from Disc't to Interest...		2,851.32		72,033.10
STOCK.				
Horses purchased....		$395.00		
One 16-horse engine purchased.............		625.00	1,020 00	
ADD—				
Valuation meters furnished......		$2,831.00		
DEDUCT—				
Engine sold..................	$625.00			
Old hydrants sold....	56.22			
Depreciation meters, old hydr'ts, stop cocks, etc............	1,750.47	2,431.69		
		$399.31		1,419.31
COAL.				
Coal purchased not used............................			7,738.39	
DEDUCT—				
Am't refunded for coal not received........		$2,118 69		5,619.70
INCOME.				
Rents paid back....................................			44.00	
Amounts carried forward........................			$84,365.63	$81,128.96

			Cash Payment.	True Cost.
Amounts brought forward			$84,365.63	$81,128.96

WATER PIPES.

Pipes purchased and not used		$12,382.82		
Deduct—				
Amount due R. D. Wood & Co		2,209.98	10,172.84	

SERVICE COCKS.

Services of Tapper		$610.66		
Service cocks purchased		1,465.93		
Cast iron boxes and iron work		667.91		
Permits not used refunded		8.30		
Services of Expressman		21.31		
Miscellaneous		177.13	2,951.24	
		$2,951.24		
Add—				
Service cocks previously paid for		79.67		
Work at shop		17.20		
		$3,048.11		
Cash receipts for tapping	$4,225.35			
Old cocks sold	21.00			
Service cocks on hand Ap'l 1, 1864,	206.16			
Profit on service cock acc't		1,404.40		
	$4,452.51	$4,452.51		

LAKE TUNNEL.

Services of Tugs in taking soundings		$429.00		
Labor		700.85		
Draughtsman		339.00		
Tools, blocks, etc		72.96		
Use of scows		408.00		
Advertising for proposals, printing specifications, etc		346.25		
Legal services		125.00		
Traveling expenses of engineer and others		195.84		
Telegrams		56.46		
Amounts carried forward		$2,673.36	$97,489.71	$81,128.96

		CASH PAYMENT.	TRUE COST.
Amounts brought forward	$2,673.36	$97,489.71	$81,128.96
Rope, $82.74; Iron & b'ksmith's work, $39.53	122.27		
Watching scows, $36; Use of boat, $6	42.00		
Miscellaneous expenses	31.15	2,868.78	
ADD—			
Work at shop	$50.84		2,919.62
		$100,358.49	$84,048.58
Total addition to Water Works brought forward		58,806.74	77,154.64
Total operating expenses brought forward		56,437.22	57,173.76
		$215,602.45	$218,376.98
Total cash expenditures	$215,602.45		
Balance of Cash in hands of City Treasurer April 1, 1864	6,531.72		
	$222,134.17		

SEWERAGE DEPARTMENT.

Trial Balance, Ledger, Board of Public Works, March 31, 1864.

	DR.	CR.
Sewers North Division	$238,528.30	
Sewers South Division	313,538.65	
Sewers West Division	343,302.62	
S. Lind, Treasurer Sewerage Commissioners	108,441.53	
Sewerage Loan Bonds, 6 per cent		$87,000.00
Sewerage Loan Bonds, 7 per cent		975,000.00
Sewerage Loan Bonds canceled		58,000.00
Sewerage Sinking Fund		58,732.86
Sewerage Sinking Fund Mortgages	16,467.10	
Discount on Sewerage Bonds	19,220.26	
Sewerage Loan Interest Account		31,728.74
House Drains	14,494.51	
Sewerage Pipes	6,038.78	
Sewerage Bricks	48.00	
Sewerage Stock	2,481.70	
American Exchange Bank	37,885.00	
Dennis Coughlin	1,561.51	
Patrick Smith	1,347.75	
Galena & Chicago Union Railroad Co		382.55
Sewerage Fund in hands of City Treasurer	79,145.52	
Sewerage Sinking Fund with City Treasurer	15,957.55	
South half Lot 5, Block 123, S. S. Addition	6.68	
Lot 5, Block 1, Johnston, Roberts & Storrs' Addit'n,	26.69	
Pittsburgh, Ft. Wayne & Chicago Railroad Co		616.84
Z. Cobb, Agt., 80 ft. west half Lot 7, Block 36, O.T.	31.53	
Chicago, Burlington & Quincy Railroad Co		6,744.01
Charles H. Cook		69.00
Sewerage man hole and catch basin covers	527.91	
Sewerage expenses and repairs	18,713.15	
East quarter Lot 2, Block 31, O. T.	396.07	
Owners Lots 1, 2, 7, 8, Block 5, J., R. & Storrs' Ad.	44.69	
East half Lot 3, Block 4, Kinzie's Addition	68.50	
	$1,218,274.00	$1,218,274.00

SEWERAGE FUND.

STATEMENT of the Cash Receipts by the Board of Public Works, from April 1, 1863, to March 31, 1864, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time:

RECEIPTS.

Proceeds 120 seven per cent. bonds sold, including premium and interest	$134,965.58	
Rec'd from City account of Sewerage Tax, 1862	21,942.11	
Rec'd from City account of Sewerage Tax, 1863	100,887.33	
House drain permits issued	2,694.22	
Materials sold and work done for private parties	2,933.77	
Interest on collateral of E. I. Tinkham & Co	255.00	
	$263,678.01	
ADD—		
Balance in hands of City Treasurer, April, 1863	87,624.43	$351,302.44

EXPENDITURES.

SEWERS—SOUTH DIVISION.

			CASH PAYMENT.	TRUE COST.
Labor		$978.92		
Services of Engineer		189.15		
Cement		105.38		
Lumber, $99.78; Tools and repair'g, $48.62		148.40		
Repaving, $18.79; Repair'g gas pipes, $30.60		49.39		
Repairing water pipes		6.52		
Miscellaneous		37.22	$1,514.98	
ADD—				
Materials for drain in Ft. D. Add.	$29.90			
Expense Sewer on Michigan Av.,	14,114.14			
" " Indiana Av.	5,136.01			
" " North St. pipe sewer	598.88			
Amounts carried forward	$19,878.93		$1,514.98	

			Cash Payment.	True Cost.
Amounts brought forward...	$19,878.93		$1,514.98	
Expense Sewer on Ringgold Pl.	35,144.82			
" " Wabash Av.	472.68			
Covers used previously paid for.	113.25			
Brick used previously paid for.	45.05			
Pipes used previously paid for.	100.40	$55,755.13		
Deduct—				
Receipts for work done..		127.03		
		$55,628.10		$57,143.08
SEWERS—WEST DIVISION.				
Labor, $3,840.74; Cement, $549.33		$4,390.07		
Services of Engineer.................. .		324.16		
Labor altering water pipes................		467.64		
Laying pipe sewers......................		311.66		
Lumber, $102.62; Repair'g gas pipes, $34.50,		137.12		
Brick, $48 ; Tools and repairing, $48.65....		96.65		
Miscellaneous.....		32.93	5,760.23	
Add—				
Expense Sewer North St......	$2,180.45			
" " North St......	1,323.89			
" " Adams St.	6,501.47			
" " Fulton St	4,195.58			
" " Harrison St ...	16,309.02			
" " Twelfth St.....	26,592.08			
" " Reuben St.....	1,690.99			
" " Maxwell St.....	8,476.06			
" " Sheldon St.....	1,041.52			
" " Canal St.......	3,164.23			
" " Rucker St.....	660.50			
" " Peck St.......	628.94			
" " Aberdeen St...	204.09			
" " Sangamon St...	54.00			
Pipes used previously paid for..	1,277.00			
Brick used previously paid for..	101.06			
Man hole and catch basin covers previously paid for	648.75	75,049.63		
Deduct—				
Receipts for work done........	$65.99			
Slants charged in error	24.37			
Am't p'd by C., B. & Q. RR. Co.	913.43	1,003.79		
		$74,045.84		79,806.07
Amounts carried forward.................. ...			$7,275.21	$136,949.15

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$7,275.21	$136,949.15

SEWERS—NORTH DIVISION.

Labor		$1,911.22		
Cement		265.94		
Tools and repairing		48.61		
Services of Engineer		299.04		
Lumber		102.62		
Miscellaneous		23.10		
Repairing water pipes		6.51	2,657.04	
ADD—				
Expense Sewer Green Bay St..	$48.60			
" " N. Market St..	16,037.26			
" " Hinsdale St....	316.93			
" " Chicago Av....	3,443.26			
" " Division St....	3,706.99			
" " Wolcott St....	1,411.60			
" " Elm St........	794.98			
" " Huron St	194.73			
" " Superior St....	199.29			
" " Pearson St....	636.43			
" " White and Wolcott Sts.....	1,199.37			
Bricks used previously paid for..	81.46			
Pipes used previously paid for...	1,134.70			
Covers used previously paid for..	487.50			
	$29,693.10			32,350.14

SEWERAGE INTEREST.

Interest on Sewerage Loan Bonds, July 1, 1863, and January 1, 1864		$69,270.00		
Commissions to American Exch. Bank		173.18	69,443.18	
DEDUCT—				
Accrued interest on 120 Bonds sold	$1,765.58			
ADD—				
Accrued interest on 20 Bonds purchased	287.78			
	$1,477.80			67,965.38
Amounts carried forward			$79,375.43	$237,264.67

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$79,375.43	$237,264.67

CLEANSING SEWERS—SOUTH DIVISION.

Labor		$1,751.28		
Tools and repairs		21.98		
Lumber, $1.87; Rope, $7.67		9.54		
Water for flushing		150.40		
Miscellaneous		9.58	1,942.78	1,942.78

CLEANSING SEWERS—WEST DIVISION.

Labor		$1,266.75		
Tools and repairs		18.13		
Lumber, $1.87; Rope, $7.68		9.55		
Water for flushing		30.08		
Miscellaneous		9.59	1,334.10	1,334.10

CLEANSING SEWERS—NORTH DIVISION.

Labor		$1,676.07		
Tools and repairs		18.11		
Lumber		1.87		
Water for flushing		75.20		
Rope, $7.68; Miscellaneous, $9.59		17.27	1,788.52	1,788.52

REPAIRS OF SEWERS—SOUTH DIVISION.

Labor		$400.17		
Cement		26.54		
Tools		7.01		
Miscellaneous		5.00	438.72	
ADD—				
Cement used previously paid for,	$14.15			
Covers used previously paid for.	306.00			
Depreciation of Tools, etc.	104.64	$424.79		
DEDUCT—				
Receipts for work done		17.13		
		$407.66		846.38
Amounts carried forward			$84,879.55	$243,176.45

			CASH PAYMENT.	TRUE C
Amounts brought forward			$84,879.55	$243,176

REPAIRS OF SEWERS—WEST DIVISION.

Labor		$391.38		
Cement		59.09		
Tools and repairs		7.00	457.47	
ADD—				
Cement used previously paid for,	$14.14			
Covers used previously paid for	179.75			
Depreciation in tools	104.64	298.53		756

REPAIRS OF SEWERS—NORTH DIVISION.

Labor		$279.45		
Cement		15.50		
Tools and repairs		7.00	301.95	
ADD—				
Cement used previously paid for	$14.14			
Covers used previously paid for	35.00			
Depreciation tools, etc	104.64			
	$153.78			45

HOUSE DRAINS.

Services of Engineer		$1,450.00		
Horse keeping for Engineer		260.38		
Labor		197.86		
Permit refunded		5.00		
Inspector		63.00	1,976.24	
DEDUCT—				
Cash receipts for permits	$2,694.22			
Permits ch'g'd owners of sundry lots	20.00			
Permits charged sewers West Division	64.00	$2,778.22		
ADD—				
Pipe junctions used		2,051.62		
		$726.60		1,24
Amounts carried forward			$87,615 21	$245,63

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$87,615.21	$245,637.82

MAN HOLE AND CATCH BASIN COVERS.

Labor		$808.61		
Oak lumber and freight		1,352.38		
Spikes and nails		205.24		
Tar, $52.50; Sand, $6.00		58.50	2,424.73	
DEDUCT—				
Covers sold	$70.00			
Covers used for sewers & rep's,	2,574.25			
Freight lumber refunded	11.25	$2,655.50		
ADD—				
Covers on hand previously paid for		758.68		
		$1,896.82		527.91

OFFICE EXPENSES AND SALARIES.

Salaries—Commissioners		$2,499.96		
Secretary		600.00		
Engineer		1,200.00		
Ass't Superintendent		466.68		
Clerks		2,570.84		
Blank books and stationery		184 83		
Advertising (including proposals for bonds)		500.36		
Lithographing bonds		250.00		
Lithographing maps		25.00		
Entering additions on City Atlas		100.00		
Printing, including report of April 1, 1863,		156.57		
Revenue stamps		66.67		
Maps, $28.33; Scientific books, $26.25		54.58		
Office furniture		103.81		
Office fixtures and repairs		40.00		
Draughtsman		10.00		
Miscellaneous		101.18	8,930.48	
DEDUCT—				
Expense charged in error	$4.00			
ADD—				
Expense charges transferred	2.50			
	$1.50			8,928.98
Amounts carried forward			$98,970.42	$255,094.71

		CASH PAYMENT.	TRUE(
Amounts brought forward		$98,970.42	$255,094
SEWERAGE PIPES.			
Pipes purchased	$3,828.39		
Labor and Miscellaneous	93.22		
Advertising proposals	11.00	3,932.61	
SEWERAGE STOCK.			
Oak sheeting and tools purchased	$268.47		
302 feet hose purchased	424.02		
Lumber	28.65	721.14	
SEWERAGE BRICKS.			
Bricks purchased and labor	$325.77	325.77	
CEMENT ACCOUNT.			
Cement purchased	$414.84	414.84	
NORTH STREET SEWER. 795 FEET. 3 FEET SEWER.			
Langan and McHugh, on contract	$766.70		
Labor, $16.50; Services Engineer, $7.69,	24.19	790.89	
ADD—			
Covers used	5.00		
Bricks furnished by C. B. & Q. R.R. Co.	528.00		
	$533.00		1,32
FULTON STREET SEWER. 674 FEET. 4½ FEET SEWER.			
J. B. Benedict, on contract	$2,595.46		
Bricks	1,127.43		
Services Engineer	42.03		
Labor	151.78		
Cement	256.08	4,172.78	
ADD—			
Covers used	12.00		
Pipes used	10.80		
	$22.80		4,19
Amounts carried forward		$109,328.45	$260,61

			Cash Payment.	True Cost.
Amounts brought forward			$109,328.45	$260,614.18
ADAMS STREET SEWER. 1418 FEET. 4½ FEET SEWER.				
John Duffy, on contract		$4,392.44		
Bricks		1,052.98		
Cement		482.54		
Services Engineer		138.13		
Repairing gas main		50.00		
Labor		266.78		
Repairing gas pipes		59.80	6,442.67	
Add—				
Covers used	$30.00			
Pipes used	28.80			
	$58.80			6,501.47
RINGOLD PL. SEWER. 852 FT. 6 FT. 1286 FT. 5 FT. 877 FT. 3 FT.				
J. B. Benedict, for mason work, labor, etc., constructing 6, 5, and 3 feet sewer		$25,222.44		
Engineers and Inspectors		272.86		
Bricks		5,385.90		
Cement		1,844.84		
Portable engine		625.00		
Fittings for the same		147.52		
Changing location of gas pipes		25.95		
Re-Macadamizing street		722.40		
Rebuilding aprons, culverts, crossings, etc.,		189.00		
Cartage on engine and pumps		14.50		
Lengthening water pipes		20.46		
Labor		556.95	35,027.82	
Add—				
Covers used	$60.00			
Pipes used	63.00	123.00		
Deduct—				
Sand sold		6.00		
		$117.00		35,144.82
HARRISON STREET SEWER. 3016 FEET. 5 FEET SEWER.				
John Duffy, on contract		$8,715.35		
Bricks		5,715.09		
Cement		1,168.02		
Amounts carried forward		$15,598.46	$150,798.94	$302,260.47

			CASH PAYMENT.	TRUE COST.
Amounts brought forward		$15,598.46	$150,798.94	$302,260.47
Engineer and Inspector		103.64		
Labor		447.34		
Lumber and nails, replacing sidewalk		21.09		
Lengthening water pipe		6.49		
Repairing gas pipes		24.00	16,201.02	
ADD—				
Covers used	$54.00			
Pipes used	54.00			
	$108.00			16,309.02

NORTH MARKET ST. SEWER. 3526 FEET. 5 FEET SEWER.

Tho. Mackin, on contract		$5,731.43		
Bricks		6,060.68		
Cement		1,897.27		
Labor		1,814.52		
Engineer and Inspector		33.16		
Lowering water main		193.50		
Teams, hauling		24.50		
Lengthening service pipe		57.30		
Sand		12.50	15,824.86	
ADD—				
Covers used	$90.00			
Pipes used	122.40			
	$212.40			16,037.26

TWELFTH STREET SEWER. 3379 FEET 5 FT. 2670 FEET 4½ FT.

William Woodruff, on contract		$11,866.04		
Bricks		10,805.20		
Cement		2,699.31		
Labor		602.70		
Engineer and Inspectors		198.09		
Filling street		181.25		
Replacing sidewalks		21.09	26,373.68	
ADD—				
Covers used	$96.00			
Pipes used	122 40			
	$218.40			26,592.08
Amounts carried forward			$209,198.50	$361,198.83

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$209,198.50	$361,198.83
HINSDALE STREET SEWER. 406 FEET. 2 FEET SEWER.				
Thomas Mackin, on contract		$231.80		
Labor		54.06		
Lengthening service pipe		16.37	302.23	
ADD—				
Covers used	$7.50			
Pipes used	7.20			
	$14.70			316.93
CHICAGO AVENUE SEWER. 1188 FEET 2 FT. 1728 FEET 2½ FT.				
Thomas Mackin, on contract		$1,662.85		
Bricks		1,243.91		
Cement		108.29		
Engineer and Inspectors		122.82		
Labor		173.12		
Plumbing work		21.32		
Lengthening service pipe		4.85	3,337.16	
ADD—				
Covers used	$82.50			
Pipes used	23.60			
	$106.10			3,443.26
REUBEN STREET SEWER. 400 FEET. 4 FEET SEWER.				
William Woodruff, on contract		$969.68		
Bricks		452.40		
Cement		133.45		
Labor		30.09		
Engineer and Inspectors		92.62	1,678.24	
ADD—				
Covers used	$3.75			
Pipes used	9.00			
	$12.75			1,690.99
DIVISION STREET SEWER. 220 FEET 5 FT. 331 FEET 3 FT.				
Langan and McHugh, on contract		$582.28		
Bricks		1,648.44		
Thomas Mackin, on contract		721.02		
Amounts carried forward		$2,951.74	$214,516.13	$366,650.01

			CASH PAYMENT.	TRUE C
Amounts brought forward		$2,951.74	$214,516.13	$366,650.
Cement		403.73		
Engineer and Inspectors		125.92		
Labor		152.53		
Lengthening service pipe		10.22	3,644.14	
ADD—				
Covers used	$32.25			
Pipes used	30.60			
	$62.85			3,706

MAXWELL STREET SEWER. 1977 FEET. 5 FEET SEWER.

Wallace Carter, on contract		$3,594.95		
Bricks		3,622.80		
Cement		902.73		
Labor		257.86		
Engineer and Inspector		26.92	8,405.26	
ADD—				
Covers used	$42.00			
Pipes used	28.80			
	$70.80			8,476

MICHIGAN AV. SEWER. 1266 FEET 3 FT. 1406 FEET 2½ FT.

Labor		$9,906.45		
Bricks		2,673.07		
Cement		1,127.21		
Engineer and Inspectors		241.06		
Timber and pine lumber		63.00	14,010.79	
ADD—				
Covers used	$63.75			
Pipes used	39.60			
	$103.35			14,114

INDIANA AVENUE SEWER. 1405 FEET. 2½ FEET SEWER.

Thomas Mackin, on contract		$2,545.27		
Bricks		1,460.80		
Cement		746.61		
Engineer and Inspectors		226.53		
Labor		101.15	5,080.36	
Amounts carried forward			$245,656.68	$392,947

			CASH PAYMENT.	TRUE COST.
Amounts brought forward			$245,656.68	$392,947.20
ADD—				
Covers used	$41.25			
Pipes used	14.40			
	$55.65			5,136.01
NORTH STREET PIPE SEWER.				
William Woodruff, on contract		$361.00		
Labor		19.77		
Services of Engineer		7.69		
Lumber		27.97	416.43	
ADD—				
Covers used	$11.25			
Pipes used	155.20			
Bricks used	16.00			
	$182.45			598.88
WOLCOTT STREET SEWER. 556 FEET 2½ FT. 314 FEET 2 FT.				
Langan & McHugh, on contract		$828.53		
Bricks		424.00		
Labor		55.37		
Inspectors		50.60	1,358.50	
ADD—				
Covers used	$22.50			
Pipes used	30.60			
	$53.10			1,411.60
ELM STREET SEWER. 369 FEET. 2 FEET SEWER.				
Langan & McHugh, on contract,		$548.88		
Bricks		166.20		
Labor and Inspecting		56.05	771.13	
ADD—				
Covers used	$11.25			
Pipes used	12.60			
	$23.85			794.98
Amounts carried forward			$248,202.74	$400,888.67

			CASH PAYMENT.	TRUE C
Amounts brought forward			$248,202.74	$400,888.
SHELDON STREET SEWER. 448 FEET. 2 FEET SEWER.				
Wallace Carter, on contract		$747.30		
Bricks		208.00		
Cement		13.28		
Inspecting and labor		47.14	1,015.72	
ADD—				
Covers used	$15.00			
Pipes used	10.80			
	$25.80			1,041.
CANAL STREET SEWER. 1773 FEET 2 FT. 664 FEET 1 FT.				
Wallace Carter, on contract		$1,809.79		
Bricks		480.00		
Cement		210.27		
Services Engineer and Inspector		119.00		
Labor		67.43		
Lengthening water pipes		13.14	2,699.63	
ADD—				
Covers used	$75.00			
Pipes used	389.60			
	$464.60			3,164.
RUCKER STREET SEWER. 486 FEET. 2 FEET SEWER.				
Wallace Carter, on contract		$304.67		
Bricks		192.00		
Inspectors and Rodmen		54.63		
Cement		63.95		
Services of Engineer		25.00	640.25	
ADD—				
Covers used	$11.25			
Pipes used	9.00			
	$20.25			660.
PECK STREET SEWER. 440 FEET. 2 FEET SEWER.				
Wallace Carter, on contract		$297.66		
Bricks		208.00		
Amounts carried forward		$505.66	$252,558.34	$405,754.

			CASH PAYMENT.	TRUE COST.
Amounts brought forward..........		$505.66	$252,558.34	$405,754.92
Cement..............................		55.19		
Labor and inspecting..................		44.09	604.94	
ADD—				
Covers used................	$15.00			
Pipes used.................	9.00			
	$24.00			628.94
ABERDEEN STREET SEWER.				
Bricks..............................		$192.00		
Labor...............................		12.09	204.09	204.09
HURON STREET SEWER.				
Bricks..............................		$175.64		
Labor...............................		19.09	194.73	194.73
SUPERIOR STREET SEWER.				
Bricks..............................		$187.20		
Labor...............................		12.09	199.29	199.29
PEARSON STREET SEWER. 253 FEET. 2 FEET SEWER.				
Langan & McHugh, on contract..........		$348 39		
Bricks..............................		227.60		
Labor...............................		19.59		
Inspector's services..................		20.75	616.33	
ADD—				
Covers used..............	$7.50			
Pipes used................	12.60			
	$20.10			636.43
WHITE AND WOLCOTT ST. SEWER. 438 FEET. 2 FEET SEWER.				
Langan & McHugh, on contract..........		$1,036.89		
Bricks..............................		80.00		
Labor and inspecting..................		60.43	1,177.32	
ADD—				
Covers us'd $11.25; Pipes $10.80,	$22.05			1,199.37
Amounts carried forward.................			$255,555.04	$408,817.77

		CASH PAYMENT.	TRUE COS
Amounts brought forward		$255,555.04	$408,817.7
WABASH AVENUE SEWER.			
Bricks	$436.68		
Labor	21.00		
Services of Engineer	15.00	472.68	472.6
SANGAMON STREET SEWER.			
Labor	$42.00		
Services of Engineer	12.00	54.00	54.0
GREEN BAY STREET SEWER.			
Carlin & McCabe, balance on contract		48.60	48.6
MISCELLANEOUS.			
Amount paid to Sinking Fund for its proportion of sewerage tax 1862, collected		$15,534.60	
Private drain constructed, lot 18, block 5, Webster, Wright & Webster's Addition		18.25	
Private drain east half lot 3, block 4, Kinzie's Add		33.00	
Private drain lots 1, 2, 7, and 8, block 5, Johnston, Roberts & Storr's Addition		44.69	
Amount of tax 1861, erroneously credited		396.06	
		$272,156.92	
Balance in hands of City Treasurer April 1, 1864		79,145.52	
		$351,302.44	

SEWERAGE SINKING FUND.

RECEIPTS.

Proportion of sewerage tax 1862..................	$15,534.60	
Interest on Sinking Fund Mortgage, H. Joy..........	295.56	
Interest (and part principal) Sinking Fund Mortgage, H. Joy......................................	1,500.00	
Balance of principal Sinking Fund Mortgage, Timothy Wright....................................	9,250.00	
Interest on same to 2d of March, 1864.............	1,605.69	
	$28,185.85	
Balance in hands of City Treasurer April 1, 1863....	10,430.60	$38,616.45

EXPENDITURES.

City tax of 1862 on east ½ lot 2, block 31, O. T., property embraced in Sinking Fund Mortgage, W. Hildebrand....................................	$110.56	
County Tax of 1862 on same......................	58.06	
Twenty Bonds purchased and canceled, Nos. 1101 to 1120 inclusive, 7 per cent.......................	20,000.00	
Premium and accrued interest on same.............	2,487.78	
Notarial fees in releasing mortgage, Timothy Wright..	2.50	
	$22,658.90	
Balance in hands of City Treasurer April 1, 1864....	15,957.55	$38,616.45

CITY DEPARTMENT.

Trial Balance, Ledger, Board of Public Works, March 31, 1864.

City Appropriation Fund	$35,088.78	
North Division		$3,621.86
South Division		4,584.99
West Division		6,557.38
Public Buildings		2,042.40
Paving in front of Post Office		814.66
Bridge Department		17.12
Chicago Cemetery		577.09
Lumber Account	144.32	
Rush Street Bridge	10,175.46	
City Expense Acc't office		251.78
Chicago Harbor		3,819.35
Public Parks		511.18
Stone Account	120.00	
Intersections of Streets		20,204.80
Dredging Bar at mouth of Harbor	19,659.34	
Widening and deepening South Branch, near Van Buren Street bridge	8,000.00	
Special Appropriation		27,659.34
City Proportional Expense Account		2,224.70
Street Lamps, West Division		301.25
Special Assessments	247,664.54	
South Water Street Improvement		80.92
Kinzie and North Water Street Improvement		370.29
Sidewalk Improvements	363.15	
West Lake Street Improvement		32,167.03
Canal Street Improvement		32.00
Alley, Block 46, Kinzie's Add		130.00
Opening Alley, Lot 5, Block-64, C. T. Sub., 7, 39, 14		139.95
North Clark Street Improvement (grading)		965.80
North Clark Street Improvement (straightening)		[illegible]
Wells Street Improvement		[illegible]
Wabash Avenue Improvement		[illegible]
Canal Street Improvement		[illegible]
Amounts carried forward		

Amounts brought forward	$321,215 59	$339,778.86
Clark Street Improvement (Nicholson pavement)		15,805.53
Lumber Street Improvement		2,800.68
Milwaukee Avenue Improvement		5,782.96
Benton Place Improvement		1,132.82
Alley, Block 7, Ft. Dearborn Add		22.16
Alley, Block 46, O. T		317.10
Holt Street Improvement		520.00
Walnut Street Improvement		490.37
Alley, Block 45, Sec. 7, 39, 14		334.55
Fourteenth Street Improvement		20,466.97
Dredging South Branch at Quarry Street		19,479.00
Dredging South Branch near Bridgeport		3,710.00
Eighteenth Street Improvement		3,520.00
Sidewalk Improvement, Block 2, Sec. 17, 39, 14		43.20
Dearborn Street Improvement		100.00
Sundry Lamp Post Assessments		4,050.72
South Water Street Improvement No. 2		2,860.67
	$321,215.59	$321,215.59

BOARD OF PUBLIC WORKS APPROPRIATION FUND.

STATEMENT of the Cash Receipts by the Board of Public Works, fron April 1, 1863, to March 31, 1864, inclusive, and detailed statemen of the cost of the various operations conducted by the Board durin the same time:

RECEIPTS.

Amount appropriated by Common Council....	$92,884.18	
Street taxes collected	516.50	
Permits issued, etc..............................	738.30	
Digging graves in Cemetery and sand sold	2,084.00	
Rent of lots, account Cemetery Fund	50.00	
Lumber sold....................................	52.68	
Hay sold	42.50	
Damages to bridges and materials sold..............	240.15	
Old iron sold from Rush street bridge..............	3,119.33	
Received from building aprons, culverts, etc., So. Div.	291.00	
Received from Chicago, Bur. & Quincy R.R. Co., acc't Canal street improvement......................	1,239.69	
Amounts erroneously charged, refunded	301.05	
Received from town of South Chicago..............	853.88	
Received from Chicago City Railway Co., paving Clark and Madison streets......................... ...	282.20	
Amount refunded by owners for filling intersections of streets, South Wells street improvement..........	3,031.37	
Repaving streets and repairing sidewalks............	1,473.08	
Replanking North Clark street from river to new North Water street............................	471.00	
	$107,670.91	
Balance in hands of City Treasurer April 1, 1863....	30,791.96	$138,462.8

EXPENDITURES.

SOUTH DIVISION.

			Cash Payment.	True Cost.
Labor on streets and sidewalks		$11,634.92		
Lumber		1,550.16		
Stone		952.63		
Gravel		220.00		
Nails and spikes		288.53		
Engineer and Rodmen		143.30		
Distributing sidewalk notices		645.33		
Repairing paving		99.13		
Six barrels composition		62.00		
One-third cost iron roller		66.66		
Tools and repairs		59.70		
Inspector		60.00		
Lettering street signs		77.90		
Miscellaneous		45.15	$15,905.41	
Add—				
Lumber used previously paid for		$322.08		
Deduct—				
Permits issued	$249.26			
Sidewalks constructed and pav'g,	296.83			
Rebuilding aprons, culverts, etc.	291.00	837.09		
		$515.01		$15,390.40

WEST DIVISION.

Labor on streets and sidewalks		$14,100.01		
Lumber		2,875.95		
Stone		1,039.74		
Nails and Spikes		585.33		
Services of Engineer and Rodman		143.38		
Distributing sidewalk notices		1,347.33		
Street taxes refunded		1.50		
Tools and repairs		103.28		
One-third cost Iron roller		66.67		
Repairing sidewalks		14.68		
Repairing culverts and crossings		22.81		
Miscellaneous		34.72	20,335.40	
Add—				
Lumber used previously paid for		$334.53		
Amounts carried forward		$334.53	$36,240.81	$15,390.40

			Cash Payment.	True Co
Amounts brought forward		$334.53	$36,240.81	$15,390.
Deduct—				
Permits issued	$248.27			
Sidewalks constructed	527.61	775.88		
		$441.35		19,894.
NORTH DIVISION.				
Labor on streets and sidewalks		$12,661.09		
Lumber		1,425.50		
Stone		673.33		
Nails and spikes		372.00		
Services Engineer, Rodman, and Inspector		200.32		
Distributing sidewalk notices		643.33		
Tools and repairs		47.26		
One-third cost iron roller		66.67		
Street taxes refunded		3.00		
Blacksmith's work		10.50		
Miscellaneous		44.82	16,147.82	
Add—				
Lumber used previously paid for	$317.91			
Gravel used	42.67	$360.58		
Deduct—				
Permits issued	$240.77			
Sidewalks constructed	682.83			
Replanking North Clark street f'm river to new North Water st	471.00	1,394.60		
		$1,034.02		15,113.
CHICAGO CEMETERY.				
Labor and teams		$2,255.61		
Salary Superintendent		233.31		
Lumber and nails		182.37		
Hardware and tools		27.00		
Hose pipe, sprinkler, etc		26.25		
Plumbing work		14.61		
Coal		11.80	2,750.95	
Deduct—				
Rec'ts dig. graves, sand sold, etc.	$2,084.00			
Rents of lots	50.00			
Gravel charged North Division	38.50			
	$2,172.50			578.4
Amounts carried forward			$55,139.58	$50,976.7

		CASH PAYMENT.	TRUE COST.
Amounts brought forward		$55,139.58	$50,976.70
LUMBER ACCOUNT.			
Lumber purchased not used		150.32	
DEDUCT—			
Lumber sold	$6.00		144.32
PUBLIC BUILDINGS.			
ENGINE HOUSES.			
Carpenters' work	$740.42		
Lumber	98.44		
Plumbing and gas fitting	181.12		
Roofing and repairs	227.51		
Rent of lot engine house No. 15	15.00		
Repairs engine house No. 15.	10.81		
Blacksmith's work	12.80		
Plastering	105.37		
Building fence engine No. 8	57.12		
Painting and glazing	88.72		
Zinc for mangers, copper, etc	59.35		
Laying platform	22.00		
Hardware	23.38		
Miscellaneous	21.26	1,663.30	1,663.30
ISLAND QUEEN ENGINE HOUSE.			
Tho. E. Courtney on contract for building	$1,747.12		
Iron work, $22.09; Lead pipe, 25.75	47.84		
Lumber	9.24	1,804.20	
ADD—			
Iron used from Rush street bridge	$21.28		1,825.48
COURT HOUSE.			
Carpenter work	$10.50		
Repairing plaster	16.25		
Carpenter work Comptroller's and Treasurer's office	473.40		
Painting, glazing, etc., do., do	198.58		
Painting and glazing	59.53		
Amounts carried forward	$758.26	$58,757.40	$54,609.80

		Cash Payment.	True
Amounts brought forward	$758.26	$58,757.40	$54,609
Hydrant and fixtures	49.27		
Patent spring hinges	63.00		
Miscellaneous	21.83	892.36	892
NORTH MARKET.			
Carpenter work	$3.50		
Plumbing	1.13		
Painting and glazing	14.80		
Locks, etc.	3.37		
Repairing pipe	5.25	28.05	2
BRIDEWELL.			
Carpenter work	$13.00		
Painting and glazing	11.78		
Nails	9.00	33.78	3
ARMORY.			
Fitting up Police Court room	$275.50		
Plastering Police Court room	10.00		
Repairing roof	2.05		
Plumbing	28.50		
Carpenter work	3.00		
Repairing Police Court room	24.74	343.79	34
WEST MARKET.			
Gas fitting	$3.38		
Carpenter work	3.00	6.38	
BRIDGE DEPARTMENT.			
Carpenter work	$551.00		
Spikes and nails	436.37		
Lumber	417.43		
Tools and hardware	41.41		
Hauling coal	29.35		
Labor, $26.68; Rope, $51.07	77.75		
Oil	166.52		
Gas and kerosene lamps	82.00		
Amounts carried forward	$1,801.83	$60,061.76	$55,91

			CASH PAYMENT.	TRUE COST.
Amounts brought forward		$1,801.83	$60,061.76	$55,914.16
Blacksmith's work		152.52		
Making patterns		80.70		
Painting and materials		74.20		
Screws, $21; Iron, etc., $1.04		22.04		
Hay, oats, and feed		115.51		
Miscellaneous		10.25	2,257.05	
DEDUCT—				
Amount erroneously charged	$68.00			
Damage to bridges	206.00			
Old iron and rope sold	34.15	$308.15		
ADD—				
Hay used	$15.00			
Iron from Rush street bridge	7.74	22.74		
		$285.41		1,971.64

NORTH AVENUE BRIDGE.

Salary of Tender, April and May, 1863	$60.00		
Carpenter work	22.25		
Stove pipe, etc	3.76		
Lumber, $11.50; Blacksmith's work, $1.64	13.14		
Coal	10.35	109.50	109.50

CLYBOURNE AVENUE BRIDGE.

Salary of Tender	$40.00		
Carpenter work and hardware	10.25		
Stove pipe, etc	8.80		
Coal	5.00	64.05	64.05

CHICAGO AVENUE BRIDGE.

Salary of Tender, April and May, 1863	$130.00		
Carpenter work	93.94		
Iron work and tools	33.50		
Lumber	48.37		
Blacksmith's work	8.03		
Labor, $12; Iron Pump, $8; Coal, $20	40.00		
Repairs on Bridge	233.54	587.38	587.38
Amounts carried forward		$63,079.74	$58,646.73

		Cash Payment.	True C
Amounts brought forward		$63,079.74	$58,646.
ERIE STREET BRIDGE.			
Salary of Tender, April and May, 1863	$130.00		
Carpenter work	101.55		
Lumber,	73.64		
Coal	21.85		
Blacksmith's work	24.06		
Iron work and tools	8.61		
Salamander stove, pipe, etc.	11.53		
Roofing bridge house	3.50		
Lathing and plastering	16.48		
Repairs on Bridge	185.80		
Repairing pump	1.50	578.52	578.
INDIANA STREET BRIDGE.			
Salary of Tender, April and May, 1863	$130.00		
Carpenter work	53.31		
Lumber	19.09		
Roofing house	3.50		
Lathing and plastering house	16.48		
Blacksmith's work	4.38		
Coal	15.00	241.76	241.
KINZIE STREET BRIDGE.			
Salary of Tender, April and May, 1863	$150.00		
Carpenter work	84.64		
Lumber	26.56		
Blacksmith's work	70		
Paint, etc., $2.75; Coal $21.85	24.60	286.50	286.
RUSH STREET BRIDGE.			
Salary of Tender, April and May, 1863	$200.00		
Carpenter work	180.62		
Iron work	17.66		
Lumber, $5.35; Nails, $20	25.35		
Coal, $22.86; Oil, 50c	23.36		
Blacksmith's work	37.37	484.36	
Deduct—			
Old iron sold	22.57		461.
Amounts carried forward		$64,670.88	$60,215.

		CASH PAYMENT.	TRUE COST.
Amounts brought forward		$64,670.88	$60,215.30
NEW RUSH STREET BRIDGE.			
Fox & Howard, amount of contract	$8,900.00		
Use of dredges	2,177.50		
Labor on wreck of old bridge	132.00		
Work on center pier	543.73		
Carpenter work, $259.16; Lumber, $73.51	332.67		
Watching wreck at night	30.00		
Covering timbers with composition	49.20		
Blacksmith's work	95.66		
Building and plastering bridge house	88.83		
Tug "Union," cost of new propeller to replace one damaged by obstructions in river	243.00		
Tools and hardware, $16.75; new bell, $12	28.75		
Twenty-six new piles, and driving	523.95		
Repairing drills, $29.15; Towing scows, $12,	41.15		
Rope	22.16		
Advertising for proposals	57.40		
Stone cutting	42.25		
Nails and Spikes	15.56	13,323.81	
DEDUCT—			
Old iron sold	$3,148.35		10,175.46
CLARK STREET BRIDGE.			
Salary of Tender, April and May, 1863	$200.00		
Carpenter work, $585.06; Labor, $63.75	648.81		
Lumber, $127.13; Iron work, $26.24	153.37		
Damage to schooner "Harrison"	20.00		
Tools, $7.15; Nails, $26.25; Coal, $15	48.40		
Thirty-five white oak piles	241.38		
Oak lumber	183.30		
Blacksmith's work	43.83		
Fourteen new piles, and driving fifty-eight	636.35	2,175.44	
ADD—			
Old iron from Rush street bridge	$22.57		2,198.01
WELLS STREET BRIDGE.			
Salary of Tender, April and May, 1863	$240.00		
Carpenter work	155.31		
Lumber, 92c; Blacksmith's work, $12.78	13.70		
Amounts carried forward	$409.01	$80,170.13	$72,588.77

		Cash Payment.	True C
Amounts brought forward	$409.01	$80,170.13	$72,588.
Coal	23.50		
Six new piles and driving	120.90		
Iron work and tools	294.63		
Painting	296.00	1,144.04	1,144.

LAKE STREET BRIDGE.

Salary of Tender, April and May, 1863	$180.00		
Carpenter work	452.57		
Lumber	42.02		
Piles and driving	112.50		
Seven new piles and driving	141.05		
Iron work and tools	17.65		
Paint, oil, etc	13.45		
Blacksmith's work, $37.09 ; Coal, $15	52.09	1,011.33	1,011.3

RANDOLPH STREET BRIDGE.

Salary of Tender, April and May, 1863	$180.00		
Carpenter work	148.05		
Lumber	20.00		
Repairing plaster of house	13.00		
Railroad iron	17.40		
Wheels for turn table	61.04		
Blacksmith's work.	21.47		
Coal, $20; Iron work, tools, etc., $96.32	116.32		
Three new piles, and driving	60.45		
Paint, oil, etc.	5.69		
Advertising for proposal for new bridge	16.50		
		659.92	659.9

MADISON STREET BRIDGE.

Salary of Tender, April and May, 1863	$180.00		
Carpenter work	145.43		
Lumber, $4.40 ; Oil, $1.94	6.34		
Wheels, blocks, patterns, etc.	49.82		
Coal, $20; blacksmith's work, $18.52	38.52		
Iron work and tools $51.09 ; Nails $15	66.09		
		486.20	486.2

VAN BUREN STREET BRIDGE.

Salary of Tender, April and May, 1863	$180.00		
Carpenter work	179.45		
Amounts carried forward	$359.45	$83,471.62	$75,890.2

		CASH PAYMENT.	TRUE COST.
Amounts brought forward	$359.45	$83,471.62	$75,890.26
Lumber	84.37		
Pulling piles	12.00		
Building house	65.00		
Iron work, tools, etc.	2.05		
Blacksmith's work	9.78		
Painting	30.25		
Coal	20.72		
		583.62	583.62

POLK STREET BRIDGE.

Salary of Tender, April and May, 1863	$150.00		
Carpenter work	177.00		
Lumber, $22.90 ; chain, $87.54	110.44		
Repairs of bridge	178.05		
Recovering chain	10.00		
Towing bridge to dry dock	20.00		
Blacksmith's work	5.38		
Iron pump, etc.	9.50		
Coal	12.86		
Stove, pipe, etc., $6.75 ; Rope, $1.28	8.03		
Iron work, tools, etc.	30.59		
		711.85	711.85

TWELFTH STREET BRIDGE.

Salary of Tender, April and May, 1863	$150.00		
Carpenter work	183.31		
Lumber	13.22		
Coal	18.69		
Lathing and plastering	40.20		
Blacksmith's work	14.56		
Iron pump	8.00		
Iron work, tools, etc.	11.22		
		439.20	439.20

OLD STREET BRIDGE.

Salary of Tender, April and May, 1863	$150.00		
Carpenter work	161.44		
Lumber	66.66		
Repairs of bridge	197.64		
Towing bridge to and from dry dock	58.00		
Tin pump	4.75		
Blacksmith's work	28.68		
Amounts carried forward	$667.17	$85,206.29	$77,624.93

		Cash Payment.	True Cos
Amounts brought forward	$667.17	$85,206.29	$77,624.9
Coal	15.00		
Iron work, tools, etc.	20.46	702.63	702.6
WESTERN AVENUE BRIDGE.			
A. Salisbury and L. Dodge, half expense of bridge over Mud Lake		172.50	172.50
EGAN AVENUE BRIDGE.			
Lumber		103.04	103.04
HALSTED STREET BRIDGE.			
Salary of Tender, April and May, 1863	$120.00		
Carpenter work	57.37		
Iron and brasswork	39.48		
Tools, $1.50; Coal, $20	21.50	238.35	238.35
ARCHER ROAD BRIDGE.			
Salary of Tender	$87.00		
Carpenter work	25.63		
Iron work	4.10		
Repairing pump, etc.	3.34	120.07	120.07
REUBEN STREET BRIDGE.			
Carpenter work	$39.93		
Iron work	9.72	49.65	49.65
OFFICE EXPENSES AND SALARIES.			
Salaries of Commissioners	$2,499.96		
" Secretary	633.34		
" Engineer	1,200.00		
" Asst. Superintendent	466.67		
" Clerks	2,529.18		
Blank books and stationery	218.17		
Advertising and daily papers	372.78		
Printing, (including report of April 1, 1863).	379.57		
Office fixtures and repairs	100.33		
Printing maps	25.00		
Entering addition to city atlas	100.00		
Amounts carried forward	$8,525.00	$86,592.53	$79,011.17

			Cash Payment.	True Cost.
Amounts brought forward		$8,525.00	$86,592.53	$79,011.17
Draughtsmen		98.00		
City maps		39.84		
Scientific books		27.77		
Stamps		28.26		
Sub. to Wells' Commercial Express		17.00		
Miscellaneous		113.39	8,849.26	
Deduct—				
Amount erroneously charged		$12.45		8,836.81

CHICAGO HARBOR.

Dredge work and inspecting		$278.25		
Timber, piles, and use of driver		374.76		
Removing sunken boats		82.00		
Taking soundings		121.00		
Labor		37.65		
Inspecting dredging		208.00		
Stone		12.60		
Carpenter work		5.13		
Surveys of ditch at Mud Lake		82.50		
Towing pile driver		6.00		
Rope and Lines		28.24		
Services of propellers		100.00		
Lettering dredges		80		
Dredging river near Rush street bridge		1,480.00	2,816.93	
Deduct—				
Inspecting, erroneously charged,	$208.00			
Stone, " "	12.60			
	$220.60			2,596.33

PUBLIC PARKS.

Trees, planting, and labor on parks		$703.56		
Repairs of fountain at Court House		35.49		
Salary of Superintendent		33.33		
Lumber		50.28		
Work on fence, Dearborn Park		156.56		
Lettering signs		6.00		
Locks, tools, etc		4.30	989.52	
Deduct—				
Hay sold		70.00		919.52
Amounts carried forward			$99,248.24	$91,363.83

		Cash Payment.	True (
Amounts brought forward		$99,248.24	$91,363
INTERSECTIONS OF STREETS.			
Paving intersections on S. Water street	$256.89		
Grading " Market street	109.06		
" " Rue San Honore	5.33		
Planking " Alley, B. 46, O. T.	9.32		
Dredging river, Bridge street	69.96		
" " Hickory street	69.96		
" " Archer road	84.80		
" " A. Lynch's subdivision	26.28		
" " Clark and Randolph streets.	870.00		
Planking alley, B. 46, O. T.	34.24		
Paving intersection of Clark and Madison	1,174.00		
Pat. Rorke, grading	56.32	2,766.16	
Deduct— Refunded by C. Railway Co. for intersec. Clark and Madison,	$282.20		2,483
CANAL STREET IMPROVEMENT.			
Hervey Nash, on contract per C., B. and Quincy R. R. Co.		1,239.69	
STONE ACCOUNT.			
Stone purchased, not used		120.00	120.
			$93,967.
Total cash expenditures		$103.374.09	
Balance in Treasurer's hands, April 1, 1864		35,088.78	
		$138,462.87	

SPECIAL ASSESSMENTS.

NORTH CLARK STREET IMPROVEMENT.

Balance unexpended, April 1, 1863	$471.00	
Labor and materials, paid		$471.00

LAKE STREET IMPROVEMENT.

Balance unexpended, April 1, 1863	$528.80	
De Golyer & McClelland, balance		$528.80

SOUTH WATER STREET IMPROVEMENT.

Balance unexpended, April 1, 1863	$131.90	
Paid F. Hathaway, rebate	50.98	
Balance to apply on expenses		$80.92

SOUTH MARKET STREET IMPROVEMENT.

Amount of assessment roll for Macadamizing South Market, from Madison to Van Buren Street	$4,762.00	
Amount second assessment for same	695.00	
		$5,457.00
Estimates paid Hervey Nash	$5,350.00	
Services of Inspector	107.00	
		$5,457.00

KINZIE AND NORTH WATER STREET IMPROVEMENTS.

Balance unexpended, April 1, 1863		$4,012.08
Estimates paid De Golyer and McClelland	$3,614.09	
Parker & Bro., damages	1.70	
Services of Inspector	26.00	
		3,641.79
Balance unexpended, to apply on expenses		$370.29

SIDEWALK IMPROVEMENTS.

Balance unexpended, April 1, 1863	$8.00
Assessment for constructing sidewalk Block 17, Bushnell's Addition	12.16
Assessment for re-laying sidewalk in front of Lots 12, 13 and 18, in Block 135, School Section	153.75
Assessment for repairing sidewalk in front of Lot 19, N. ½ Lot 24, Block 135, S. Section	4.84
Amount carried forward	$178.75

Amount brought forward..................	$178.75	
Assessment for re-laying sidewalk of Lot 16, Gurley's Subdivision, N.E. ¼ Sec. 21, 39, 14	21.90	
		$200.65
Rebate to Conn. Mut. Life Insurance Company....	$12.16	
Elliott & Thurlow, relaying and repairing sidewalks.	180.49	192.65
Balance to apply on expenses....................		$8.00

WEST LAKE STREET IMPROVEMENT.

Assessment roll for paving West Lake Street with Nicholson pavement, from the river to west side of Halsted street		$45,438.20
Estimates paid De Golyer & McClelland	$12,392.69	
Rebate to Henry Weber, for building curb walls....	359.11	
Rebate to B. Bernauer	245.38	
" Dr. M. Parker	11.80	
" T. M. Avery	28.44	
Services of Inspector......................... ...	220.00	
Advertising	13.75	13,271.17
Balance unexpended.		$32,167.03

CANAL STREET IMPROVEMENT.

Assessment roll for grading and Macadamizing Canal street, from Lake street to Fulton street	1,212.00
Estimates paid H. Nash	1,180.00
Balance unexpended	$32.00

IMPROVEMENT OF ALLEY IN BLOCK 46, KINZIE'S ADDITION.

Assessment roll for opening Alley through Block 46, Kinzie's Addition.............	$230.00
W. S. McCormick, damages	100.00
Balance unexpended	$1.30

IMPROVEMENT OF ALLEY IN BLOCK 46, O. T.

Assessment for planking Alley running N. & S. through continuation of B. 46, O. T.............	$606.84
Estimates paid H. Witbeck & Co.................	606.84

OPENING ALLEY S.W. ¼ LOT 5, B. 64, C. T. SUB. SEC. 7, 39, 14.

Assessment for opening Alley E. and W. through centre of W. 90 ft. Lot 2 and B. 64, Canal Trust. Sub., Sec. 7, 39, 14	$239.95
Damages allowed J. F. Smith....................	100.00
Balance unexpended	$139.95

NORTH CLARK STREET IMPROVEMENT.

Assessment roll for grading North Clark street, from its intersection with Wells street to the centre of Fullerton avenue		$4,346.13
W. H. Turner, estimates paid	$3,100.96	
Services of Inspector	105.60	
Rebate to M. Porter	59.12	
" J. Atwater	10.28	
" W. Barry	104.87	
		3,380.83
Balance unexpended		$965.30

NORTH CLARK STREET IMPROVEMENT.

Assessment for straightening North Clark street, between North avenue and Fullerton avenue	$860.00

WELLS STREET IMPROVEMENT.

Assessment for paving Wells street with Nicholson pavement, from Madison street to Van Buren st.		$33,259.82
Rebate to Est. J. High, jr.	$43.20	
" J. W. Scoville, Ag't.	371.25	
" C. H. J. Miller	13.23	
		427.68
Balance unexpended		$32,832.14

WABASH AVENUE IMPROVEMENT.

Assessment for paving Wabash avenue with Nicholson pavement, from Randolph to Fourteenth st.		$98,207.48
Van H. Higgins, rebate	$14.40	
O. Smith, rebate	36.74	
		51.14
Balance unexpended		$98,166.34

CANAL STREET IMPROVEMENT.

Assessment roll for re-Macadamizing Canal st., from Twelfth street to track of the south branch of G. & Chic. Union R. R.		$2,685.56
Estimates paid H. Nash	$1,712.17	
Service of Inspector	126.40	
		1,838.57
Balance unexpended		$846.99

CLARK STREET IMPROVEMENT.

Assessment roll for paving Clark street with Nicholson pavement, from north side of Polk street to the north side of Taylor street....................		$15,805.53

RANDOLPH STREET IMPROVEMENT.

Assessment roll for repaving Randolph street with Nicholson pavement from the west side of State street to the west side of the east approach to the bridge at Randolph street.....................	$25,384.57	
Assessment annulled by Common Council, Dec. 21, 1863....................................		$25,384.57

LUMBER STREET IMPROVEMENT.

Assessment roll for grading and planking Lumber street from south line of lot 1, block 4, Canal Trustees' Sub. W. ½ Sec 21, etc., to its intersection with track of C., P. & Ft. Wayne Railroad..		$2,800.68

SOUTH WATER STREET IMPROVEMENT.

Assessment roll for paving South Water Street with Nicholson pavement, from the east line of Wabash avenue to the west line of Michigan avenue......		$2,860.67

MILWAUKEE AVENUE IMPROVEMENT.

Assessment roll for Macadamizing Milwaukee avenue, from Elston road to the center of North avenue...................................		$13,378.38
Estimates paid J. McMahon.....................	$7,408.52	
Services of Inspector	186.90	
		7,595.42
Balance unexpended........................ ...		$5,782.96

IMPROVEMENT OF ALLEY IN B. 7, FT. DEARBORN ADD.

Assessment roll for grading and planking alley running east and west in B. 7, Ft. Dearborn Add.; also alley running north from said east and west alley to South Water street...................		$910.64
Estimates paid A. Salisbury and L. Dodge		888.48
Balance unexpended...........................		

BENTON PLACE IMPROVEMENT.

Assessment roll for grading and planking Benton place, between State street and Wabash avenue..	$1,132.82

IMPROVEMENT OF ALLEY, B. 46, O. T.

Assessment roll for filling, grading, and planking alley running north and south through the center of B. 46, O. T.	$323.16
Witbeck & Co., damages	6.06
Balance unexpended	$317.10

HOLT STREET IMPROVEMENT.

Assessment roll for the extension of Holt street, from Clarinda street to Cornell street	$520.00

WALNUT STREET IMPROVEMENT.

Assessment roll for the extension of Walnut street, through east ½ B. 45, C. T. Sub. Sec. 7, 39, 14...	$490.37

IMPROVEMENT OF ALLEY, B. 45, SEC. 7, 39, 14.

Assessment roll for the extension of alley, 18 feet in width, in west ½ B. 45, through Assessors' subdivision of east half of said block	$334.55

FOURTEENTH STREET IMPROVEMENT.

Assessment roll for the extension of Fourteenth st., fifty feet wide, from State st. east to Indiana av..	$22,075.00

DREDGING SOUTH BRANCH OF CHICAGO RIVER AT QUARRY STREET.

Assessment roll for dredging and deepening Chicago river, between Quarry street and forks of the So. Branch, near Ills. & Mich. Canal	$19,479.00

DREDGING SOUTH BRANCH OF CHICAGO RIVER, NEAR BRIDGEPORT.

Assessment roll for dredging and deepening the Chicago river, so as to admit of the passage of vessels from its junction with Ills. & M. C. to the south line of property of Messrs. J. A. Lightall & Co. and Stone & Co.	$3,710.00

EIGHTEENTH STREET IMPROVEMENT.

Assessment roll for straightening Eighteenth street, from the west line of the So. Branch of Chicago river to the east line of Lumber street	$3,520.00

RUE SAN HONORE IMPROVEMENT.

Assessment roll for grading Rue San Honore, from Madison street to Adams street...	$49.00
P. Rorke, grading............................	$49.00

JACKSON STREET IMPROVEMENT.

Assessment roll for grading Jackson street, from S. W. Plank road to Josephine street............	$82.18
P. Rorke, grading....	$82.18

SIDEWALK IMPROVEMENT IN FRONT OF B. 2, SEC. 17, 39, 14.

Assessment roll for rebuilding sidewalks in front of lots 11, 12, 13, 14, 21, and 22, B. 2, Sec. 17, 39, 14,		$129.60
E. S. Hurlbut, rebate........................	$24.00	
D. Leilenthal, rebate........	19.20	
B. Bartelme, rebuilding	43.20	
		86.40
Balance unexpended..........................		$43.20

DREDGING BAR AT MOUTH OF HARBOR.

Fox & Howard, dredging 44,522.74-100 cubic yards	$18,922.49
Services of Inspectors......................	632.00
Iron bolts and stone for buoys..................	72.60
Marking and painting buoys	22.75
Advertising for proposals......................	9.50
	$19,659.34

WIDENING AND DEEPENING SOUTH BRANCH OF CHICAGO RIVER,

NEAR VAN BUREN STREET BRIDGE.

Fox & Howard, estimates paid..................	$8,000.00

LAMP POST ASSESSMENTS.

POLK STREET.

Assessment for the erection of ten lamp posts, from Canal to Foster............................		$320.00
Bouton & Co., account ten lamp posts	$138.13	
F. Hartman, account ten lamps..................	35.00	
		173.13
Balance unexpended		$146.87

JEFFERSON STREET.

Assessment for the erection of two lamp posts, between Ewing and Polk streets		$64.00
Bouton & Co., account two lamp posts	$27.63	
F. Hartman, account two lamps	7.00	
T. Larkins, rebate	14.00	
C. Malone, rebate	10.90	
		59.53
Balance unexpended		$4.47

JEFFERSON STREET.

Assessment for the erection of six lamp posts, between Harrison and Polk streets		$192.00
People's Gas L. & C. C., for service pipe, etc	$40.00	
Bouton & Co., acc't six lamp posts	82.88	
F. Hartman, acc't six lamps	18.00	
		140.88
Balance unexpended		$51.12

MATHER STREET.

Assessment for the erection of six lamp posts, between Canal and Jefferson		$192.00
People's Gas L. & C. Co., acc't service pipe, etc	$30.00	
Bouton & Co., acc't six lamp posts	82.88	
F. Hartman, acc't six lamps	18.00	
		130.88
Balance unexpended		$61.12

FULTON STREET.

Assessment for the erection of five lamp posts, between Peck and Reuben streets	$160.00

FULTON STREET.

Assessment for the erection of three lamps posts, between Sangamon and Morgan streets	$96.00

SANGAMON STREET.

Assessment for the erection of two lamp posts, between Carroll and Fulton streets	$64.00
Bouton & Co., acc't two lamp posts	27.63
Balance unexpended	$36.37

JACKSON STREET.

Assessment for the erection of four lamp posts, between Throop and Loomis streets		$128.00
People's Gas L. & C. Co., acc't service pipe, etc.	$20.00	
Bouton & Co., acc't four lamp posts	55.25	
F. Hartman, acc't four lamps	8.00	
		83.25
Balance unexpended		$44.75

WEST JACKSON STREET.

Assessment for the erection of 5 lamp posts, between Halsted and Desplaines street		$160.00
People's Gas L. & C. Co., acc't service pipe	$25.00	
Bouton & Co., acc't five lamp posts	69.06	
F. Hartman, acc't five lamps	17.50	
		111.56
Balance unexpended		$48.44

ST. JOHN'S PLACE.

Assessment for the erection of three lamp posts, between Lake and Fulton streets		$96.00

SHELDON STREET.

Assessment for the erection of two lamp posts, between Randolph and Washington streets		$64.00
People's Gas L. & C. Co., acc't service pipe, etc.	$10.00	
Bouton & Co., acc't two lamp posts	27.62	
F. Hartman, acc't two lamps	7.00	
		44.62
Balance unexpended		$19.38

TAYLOR STREET.

Assessment for the erection of seven lamp posts, between Canal and Jefferson streets		$224.00
People's Gas L. & C. Co., acc't service pipe, etc.	$20.00	
Bouton & Co., acc't seven lamp posts	96.69	
F. Hartman, acc't four lamps	21.00	
		137.69
Balance unexpended		$86.31

WEST ADAMS STREET.

Assessment for the erection of sixteen lamp posts, between Canal and Halsted streets		$512.00
People's Gas L. & C. Co., acc't service pipe, etc.	$30.00	
Bouton & Co., acc't fourteen lamp posts	193.37	
F. Hartman, acc't lamps	21.00	
		244.37
Balance unexpended		$267.63

WEST ADAMS STREET.

Assessment for the erection of eight lamp posts, between Rucker and Morgan streets		$256.00
People's Gas L. & C. Co., acc't service pipe, etc.	$40.00	
Bouton & Co., acc't eight lamp posts	110.50	
F. Hartman, acc't eight lamps	23.00	
Rebate to T. Lattan	3.16	
		176.66
Balance unexpended.		$79.34

CLINTON STREET.

Assessment for the erection of twenty-four lamp posts, between Maxwell and Polk Streets		$768.00
People's Gas L. & C. Co., acc't service pipe, etc.	$120.00	
Bouton & Co., acc't twenty-four lamp posts	331.50	
F. Hartman, acc't twenty-four lamps	84.00	
		535.50
Balance unexpended		$232.50

PEORIA STREET.

Assessment for the erection of two lamp posts, between Randolph and Lake streets		$64.00
People's Gas L. & C. Co., acc't service pipe, etc.	$10.00	
Bouton & Co., acc't two lamp posts	27.62	
F. Hartman, acc't two lamps	2.00	
		39.62
Balance unexpended		$24.38

WEST LAKE STREET.

Assessment for the erection of twenty-five lamp posts, between Paulina and Leavitt streets	$800.00
Bouton & Co., acc't twenty-five lamp posts	345.31
Balance unexpended	$454.69

LOOMIS STREET.

Assessment for the erection of six lamp posts, from Jackson to half way between Van Buren and Tyler streets		$192.00
People's Gas L. & C. Co., acc't service pipe	$30.00	
Bouton & Co., acc't six lamp posts	82.87	
F. Hartman, acc't six lamps	21.00	
		133.87
Balance unexpended		$58.13

DESPLAINES STREET.

Assessment for the erection of sixteen lamp posts, from Harrison to 250 feet north of Adams street,		$512.00
People's Gas L. & C. Co., acc't service pipe	$85.00	
Bouton & Co., acc't sixteen lamp posts	221.00	
F. Hartman, acc't sixteen lamps	56.00	
		362.00
Balance unexpended		$150.00

WARREN STREET.

Assessment for the erection of twenty lamp posts, between Reuben and Robey streets		$640.00
People's Gas L. & C. Co., acc't service pipe	$70.00	
Bouton & Co., acc't seventeen lamp posts	234.82	
F. Hartman, acc't fourteen lamps	49.00	
Rebate to M. Nelson	13.96	
		367.78
Balance unexpended		$272.22

ABERDEEN STREET.

Assessment for the erection of four lamp posts, between Monroe and Adams streets		$128.00
People's Gas L. & C. Co., acc't service pipe, etc.	$10 00	
Bouton & Co., acc't four lamp posts	55.24	
F. Hartman, acc't two lamps	7.00	
Rebate to Mrs. C. A. Andrews	14.40	
		86.64
Balance unexpended		$41.36

TWELFTH STREET.

Assessment for the erection of three lamp posts, between Clinton and Jefferson streets	$96.00

JUDD STREET.

Assessment for the erection of five lamp posts, between Canal and Jefferson streets		$160.00
People's Gas L. & C. Co., acc't service pipe, etc.	$25.00	
Bouton & Co., acc't five lamp posts	69.06	
F. Hartman, acc't five lamps	17.50	
		111.56
Balance unexpended		$48.44

DEPUYSTER STREET.

Assessment for the erection of three lamp posts, to a point 450 feet west of Desplaines street		$96.00
Gas Light Co., acc't service pipe	$15.00	
Bouton & Co., acc't three lamp posts	41.44	
F. Hartman, acc't three lamps	10.50	
		66.94
Balance unexpended		$29.06

WEST VAN BUREN STREET.

Assessment for the erection of four lamp posts, between Halsted and Desplaines		$128.00
People's Gas L. & C. Co., acc't service pipe, etc.	$20.00	
Bouton & Co., acc't four lamp posts	55.25	
F. Hartman & Co., four lamps	14.00	
		89.25
Balance unexpended		$38.75

WEST VAN BUREN STREET.

Assessment for the erection of four lamp posts, from Sangamon to a point 175 feet west of Morgan st.,		$128.00
People's Gas L. & C. Co., service pipe	$20.00	
Bouton & Co., acc't four lamp posts	55.25	
F. Hartman, acc't 4 lamps	14.00	
Rebate to S. Hoard	6.65	
		95.90
Balance unexpended		$32.10

WEST TWELFTH STREET.

Assessment for the erection of five lamp posts, between Blue Island Avenue and Rucker street		$160.00

PRICE PLACE.

Assessment for the erection of four lamp posts, between Desplaines and Halsted		$128.00
People's Gas L. & C. Co., acc't service pipe	$20.00	
Bouton & Co., acc't four lamp posts	55.25	
F. Hartman, acc't four lamps	14.00	
		89.25
Balance unexpended		$38.75

PARK AVENUE.

Assessment for the erection of four lamp posts, between Paulina and Reuben streets	$128.00
Bouton & Co., acc't four lamp posts	55.25
Balance unexpended	$72.75

WEST MONROE STREET.

Assessment for the erection of fourteen lamp posts, between Canal and Halsted		$448.00
People's Gas L. & C. Co., acc't service pipe	$10.00	
Bouton & Co., acc't fourteen lamp posts	193.38	
F. Hartman, acc't two lamps	7.00	
		210.38
Balance unexpended		$237.62

CARPENTER STREET.

Assessment for the erection of three lamp posts, between Kinzie and Carroll streets	$96.00
Bouton & Co., acc't three lamp posts	41.46
Balance unexpended	$54.54

CARROLL STREET.

Assessment for the erection of fifteen lamp posts, between Halsted and Carpenter streets	$480.00
Bouton & Co., acc't fifteen lamp posts	207.19
Balance unexpended	$272.81

BLUE ISLAND AVENUE.

Assessment for the erection of six lamp posts, between Maxwell and Mitchell streets		$192.00
Bouton & Co., acc't six lamp posts	$82.88	
Rebate to W. Ruehl	4.81	
		87.69
Balance unexpended		$104.31

WILLARD PLACE.

Assessment for the erection of two lamp posts, between West Randolph and West Washington..		$64.00
Bouton & Co., acc't two lamp posts	$27.62	
F. Hartman, acc't two lamps....................	7.00	
		34.62
Balance unexpended		$29.38

PRAIRIE AVENUE.

Assessment for the erection of four lamp posts, between Monterey and Buena Vista		$128.00
Bouton & Co., acc't four lamp posts..............	$55.25	
F. Hartman, acc't four lamps.....................	14.00	
People's Gas L. & C. Co., acc't service pipe	34.00	
		103.25
Balance unexpended............................		$24.75

EIGHTEENTH STREET.

Assessment for the erection of sixteen lamp posts, between State and Grove.....................		$512.00
Bouton & Co., acc't sixteen lamp posts...........	$221.00	
F. Hartman, acc't sixteen lamps	56.00	
People's Gas L. & C. Co., acc't service pipe.......	136.00	
Rebate to J. Brennan	15.94	
		428.94
Balance unexpended		$83.06

GROVE STREET.

Assessment for the erection of four lamp posts, between Eighteenth and Nineteenth streets......		$128.00
People's Gas L. & C. Co., acc't service pipe.......	$34.00	
F. Hartman, acc't four lamps.....................	14.00	
		48.00
Balance unexpended.......		$80.00

MICHIGAN AVENUE.

Assessment for the erection of five lamp posts, between Buena Vista and Rio Grande....		$160.00
Bouton & Co., acc't five lamp posts..............	$69.06	
People's Gas L. & C. Co., acc't service pipe	51.00	
F. Hartman, acc't five lamps	17.50	
		137.56
Balance unexpended		$22.44

HARMON COURT.

Assessment for the erection of two lamp posts, between State and Michigan avenue............		$64.00

DEARBORN STREET IMPROVEMENT.

Assessment for widening Dearborn street, from the south line of Madison street to centre of Block 119, School Section Addition..................		14,600.00
Mrs. C. O. Fuller, land damages	$7,250.00	
O. Lunt, trustee, etc., "	7,250.00	
		14,500.00
Balance to apply on expense of assessment..............		$100.00

APPENDIX.

LAKE TUNNEL CONTRACT.

SPECIFICATIONS FOR LAKE TUNNEL.

LOCATION AND GENERAL DESCRIPTION.

The tunnel is to commence at such point as may be selected by the Board of Public Works, on the lot now occupied by the pumping works of the city of Chicago, at the east end of Chicago avenue, and on the shore of Lake Michigan; and to extend two miles out under the lake, in a straight line, at right angles to the general direction of the shore.

The bottom of the inside surface of the east end of the tunnel shall be sixty-six feet below the ordinary lèvel of the lake, or sixty-four feet below what is usually known as "City Datum;" and the bottom surface shall descend uniformly at the rate of two feet per mile to the west end of the tunnel.

There are to be one land and two to four lake shafts; the land shaft at the west end, one lake shaft at the east end, and the remaining lake shaft or shafts at such intermediate points as shall be determined upon by said Board, when the proper time for locating them shall arrive. The lake shafts are to consist of cast iron cylinders, and to be protected by hollow pentagonal cribs.

The tunnel is to be very nearly circular in form, and to have an interior width of five feet, and height of five feet and two inches.

CRIBS.

It has been proposed to construct four cribs, on the supposition that this number might be required to complete the tunnel in two years, but if, after commencing the work, it shall be found in time that one or more of them may be omitted, such omission shall be made; and for this reason but two cribs shall be commenced before the probable rate of progress in the tunnel, from the land shaft, shall have been satisfactorily ascertained.

DESCRIPTION.

The cribs are to be five-sided, each outer side to be fifty-eight feet long. There is to be a central space in each crib, in form similar to the outside, leaving the thickness between the central space and outside of the crib twenty-five feet. The interior and exterior sides of the cribs are to be perpendicular from their bottoms to their tops, which are to be five feet above the ordinary surface of the lake; hence, the outermost crib is to be forty feet high. The height of the others will depend upon their location, which will be determined during the progress of the work.

The outer crib is to have three openings through its sides, one opening through each of the western and southern sides; each opening to be five feet high and four feet wide, and to be connected with the top of the crib by a well four feet square. The most northern opening is to have its bottom five feet above the bottom of the crib, the middle one eleven feet higher, and the southern one eleven feet higher than the middle. Each opening is to be furnished with an iron paddle gate, to be worked by means of an iron rod, from the top of the crib, as shown on plans No. 9 and 10.

Each crib is to be provided with two gates, each two feet high, and one and a half feet wide, placed five feet above the bottom of the crib, and against the wall of the inside space. These gates to be used for regulating the sinking of the cribs to their places, and worked by rods from the top of the crib, as shown on plans No. 11 and 12. Wrought iron gratings to protect these gates must be provided as shown on these plans.

MODE OF CONSTRUCTION.

The bottom of each crib shall be formed by an outer, inner, and middle line of twelve-inch square white pine timber, which shall be connected with cross timbers of the same size, and with twelve by three inch joists placed two feet apart from center to center, and the under side of the whole, except the central space of the crib, sheathed over with two inch pine plank, fastened on by six inch spikes driven through each plank in every timber and joist, as shown on plan No. 5. All the timbers and cross timbers are to be connected by dovetail joints the full width of each timber, and of equal depth in each, the dovetail being one inch deeper at its end than at its shoulder. On the outer, inner, and middle lines of timber, and on the angle pieces of the outer and middle lines, solid walls of twelve inch square timber are to be built up to a height of forty feet above the bottom for the outer crib, and to a height of five feet above ordinary water mark, for the other cribs. The middle wall extends solid from outside to outside of the crib; the inner wall only around the inner space. The angle timbers are eleven and a half feet long from tip to tip. Between the outer and middle walls there are two lines of cross timbers on each side of the crib, and between the middle and inner walls, three lines. The cross timbers are twelve inches square, placed twelve inches apart above each other, and extend through each wall. All of the timber and lumber, except the upper twelve feet in each outside wall, is to be of sound white pine. The upper twelve feet of the outer wall to be of sound white oak, free from sap, or any imperfections tending to hasten decay. All of the joints of the timbers at the angles of the outer and inner walls, at the ends of the middle walls, and at the ends of the cross timbers, are to be dovetailed like those described for the bottom course of timbers in the crib. Where the timbers of the middle wall cross each other, they are to be notched half and half. Whenever the ends of timbers butt against each other in the outer and inner walls, they must do so at the center of the end of some cross timber, where the dovetailed end can be made to lap over the butt joint. (See plan No. 2.) On the bottoms and sides of the three openings through the outer crib, twelve inch square timbers touching each other are to be run entirely through the ends; and across the top of the openings six inch plank are to be spiked, fitting close to each other. The walls from each opening to the top of the crib are to be formed of six inch plank placed horizontally, and notched into the crib timbers wherever they can be. See plans No. 1, 2, 3 and 4.

The timbers in the outer and middle walls of each crib are to be fastened to each other by $1\frac{5}{16}$ inch square wrought iron bolts thirty inches long, with ragged edges, and driven into the timber at an angle twelve degrees from a perpendicular, and inclining alternately towards each other, as shown on plan No. 2. The timbers of the inner wall are to be fastened in a similar manner to those of the outer and middle, except that the bolts are to be but one inch square.

Each outer angle of the crib is to be protected by a covering of wrought iron one inch thick, extending two feet each way from the corner, and from the top of the crib downwards ten feet. These angle irons are to be fastened on by round wrought iron one and a-half inch bolts, one through every timber, on each side of the corner. The bolts are to be alternately long and short, the long being fastened through the middle timbers of the crib, and the short through the outer timbers, as shown on plans No. 6, 7 and 8. The long bolts are to be used also in the lower part of the crib, from the bottom to the angle iron, in every other timber.

The spaces between the joists at the bottom of the crib are to be filled with gravel or broken stone flush with the tops of the joists. The joists are to be planked over with two inch pine, fastened down with six inch spikes.

There are to be twenty-five pairs of one-inch round wrought iron rods to connect saddles placed under bottom timbers and over top ones, as shown on plans No. 1, 3 and 5. The forms and mode of placing the saddles and connecting the rods with them and with each other are shown on plans No. 23, 24 and 25.

The whole of the joints on the bottom of the crib, around the outside and central space of the crib from its bottom to within four feet of the top, and the joints around the inside of the three openings and their wells, are to be thoroughly calked with oakum and paid with tar.

Each crib shall, immediately after being towed to its proper position, be secured by one and a-half inch iron cables to five Mitchell's mooring screws, forced ten feet into the clay at the bottom of the lake. The dimensions and form of these screws can be seen on plans No. 26 and 27.

Each crib is to be filled with sound rubble stone, from its bottom to its top, as soon after being moored as practicable.

The angles of each crib shall be placed exactly in such positions as the Board of Public Works may direct.

THE LAND SHAFT.

This will be located near and in the rear of the present pumping works of this city. From the surface of the ground to a depth of fifteen feet below the level of the lake, the shaft is to be twelve feet in diameter; and then it is to be contracted by a sloping offset of three feet all around to six feet diameter, to five feet below the bottom of the invert of the tunnel, a distance of sixty feet.

The whole of the shaft is to be lined with brick masonry twelve inches thick, where the shaft is twelve feet in diameter, and eight inches thick, where it is six feet diameter, and on the invert at its bottom. The masonry of the offset is to be twelve inches thick. See plans No. 13, 14 and 15.

The masonry is to be formed of hard-burnt, clear ringing, and well formed bricks, entirely free from lime, not less than eight inches long, two and a quarter inches thick, and four inches wide, to be laid upright in cement mortar, and in rings or shells four inches thick. The courses must be horizontal, the inside surface of the shaft must be true and cylindrical, and the joints between the bricks not over a quarter of an inch on the inside of each ring.

The cement mortar is to be equal to the best of Clark's La Salle, and mixed with one measure of clean sharp sand to one of cement, and used as soon as possible after being mixed.

The joints between the rings must be not less than half an inch, and all the joints in the masonry must be perfectly filled with mortar at the *time* the masonry is laid.

Where the natural soil around the shaft is sand or loose material, there is to be not less than twelve inches of thoroughly puddled clay on the outside of the masonry.

Whatever timber and lumber may be necessary to support the earth around the shaft, before the masonry can be built, must be furnished and put in by the contractor.

The pumping, and all labor and machinery connected therewith, must be done and furnished by the contractor.

INLET CYLINDER FOR OUTER LAKE SHAFT.

To be nine feet in diameter, inside, and two and a quarter inches thick. To be made in sections of about nine feet in length, so that seven sections will make up the total length of the cylinder, or sixty-four feet. The flanches to be five and five-eighths inches wide by 2¼ inches thick, and to be faced in the lathe true and at right angles to the center line of the cylinder. Each flanch to have a small annular groove turned into the face, to receive the putty to be used in making the joint, as shown on the drawing. Flanches to be drilled for bolts 1¼ inches diameter and about seven inches between centers. The lower section to be turned a taper of $\frac{1}{16}$ of an inch, in nine inches from the end on the outside. The balance of the section to be accurately and truly turned parallel the entire length above the taper.

The second and third sections, and, if required, the fourth section, from the bottom to be accurately and smoothly turned, each section of a diameter slightly in excess of the one next below it, say the 64th part of an inch, and should there be any difference in the diameter of opposite ends of the same section, then the largest end to be connected uppermost. See plans No. 17, 18, 21 and 22.

The section next below the top one is to be provided with openings for inlet gates; plans and specifications for which will be given to the contractor whenever necessary after one month from the letting of the work, and all additional expense to the contractor in making such opening will be paid for as extra.

INTERMEDIATE CYLINDERS FOR LAKE SHAFTS.

To be one to three in number, to be nine feet diameter, inside, and 1⅝ inches thick. To be made in sections of about nine feet in length, so that seven sections will make up the total length of cylinder, whether sixty-five, sixty-six or sixty-seven feet. The flanches to be five inches wide by 1¾ inches thick, and faced as specified for the "inlet cylinder." Flanches to be drilled for bolts 1½ inches diameter, and about seven inches between centers. Three or four of the lower sections to be turned on the outside as may be required, and as specified for the "inlet cylinder." The sections to be stiffened by two intermediate internal flanches 2⅝ inches wide by 1¾ inches thick. At the top of the third or fourth section from the bottom, as may be required, the flanch to have a double width to receive a bonnet or head for closing and disconnecting the cylinder at that joint, as delineated on the drawing. See plans No. 19, 20, 21 and 22.

The iron employed in the construction of the cylinders to be of good quality. The castings to be sound and free from sand holes or other defects.

Bolts for connecting the cylinders to be made of the best wrought iron, 1½ inches diameter, with hexagonal heads and nuts.

Joints between cylinder section flanches to be made air-tight with thin red lead putty. All necessary work, materials, machinery and tools for completing and putting in place the cribs and cylinders to be done and furnished by the contractor.

THE TUNNEL PROPER.

The clear width of the tunnel is to be five feet, and the clear height five feet and two inches, the top and bottom arches to be semi-circles. The tunnel is to be lined with brick masonry eight inches thick, in two rings or shells, the bricks to be laid lengthwise of the tunnel with toothing joints. The mortar, character of materials and workmanship, are to be like those described for the land shaft. See plan No. 16.

The excavation for the tunnel, when through sufficiently firm clay, shall conform exactly to the outside of the masonry on the bottom and sides. On top, just enough of excavation above the masonry will be allowed, to give room to turn and key the upper arch properly. Sections of not over two feet of the upper arch are to be built at a time, and immediately after each section is keyed, the space above it shall be filled with earth, which shall be put into the space in small quantities at a time, and thoroughly rammed until it becomes as solid as the natural soil above.

Should a soil be met with in any part of the tunnel, requiring the sides, bottom and top to be planked and braced before the masonry can be built, filling in, carefully and thoroughly done, shall be put in between the masonry and the boarding, in or between the masonry and sides of the excavation, as is specified for the upper arch in a firm soil. The material for this filling may be dry sand or puddled clay.

All timber and lumber necessary for bracing and supporting the sides of the tunnel and shafts, previous to the completion of the masonry, must be furnished and put in place by the contractor.

The contractor must furnish and put in place all necessary air-pipes, and apparatus for ventilating the tunnel, all pumps, steam engines, hoisting apparatus and fixtures for the same, all sheds and shelters for the protection of workmen and materials on the cribs, and all necessary tracks, trucks and other necessary implements or machinery for removing excavated material out of, and building materials into, the tunnel.

The contractor must also remove all excavated material taken out of each shaft to such points as shall be designated by the Board of Public Works, provided said points shall not exceed three hundred feet from any shaft, and must provide all necessary tug-boats, scows and other means of transportation, and implements required for such removal.

GENERAL SPECIFICATIONS.

The contractor shall furnish and maintain such lights as may be necessary to avoid danger to navigation; and in case of failure to do so, shall be liable for all damages the city may have to pay on account of such failure.

All materials, of whatever kind, to be used in the work, are to be inspected by the Board of Public Works; and all unsuitable materials are to be immediately removed from the work by the contractor.

The contractor shall discharge from his employment, when directed by the Board of Public Works, all unfaithful and incompetent workmen.

The Board of Public Works must be permitted to remove such portions of the work as they may from time to time think necessary for the discovery of improper materials or workmanship; and the contractor shall restore such work at his own expense, in case it shall have been done improperly; and at the expense of said Board if done in a proper manner.

Any work, materials, machinery or tools necessary for the completion of the tunnel, cribs or shafts, omitted in the plan and specifications, shall be done or furnished by the contractor, and paid for as extra work, at such valuation as the Board of Public Works may make. This section is not to apply to the completion of the work as specified, but only to extra work, and no tools and machinery to be paid for unless ordered by the Board for extra work.

The contractor shall furnish men and stakes sufficient to enable the engineer in charge of the work to give the necessary lines and levels to construct the work by.

The contractor must deliver to the Board of Public Works on or before the 1st day of each month, a written statement of the amount of extra work done, and extra materials furnished during the previous month.

The contractor will be required to keep the work in perfect repair for twelve months after the same shall have been faithfully completed to the satisfaction of the Board of Public Works.

Monthly estimates will be made by the Board of Public Works of the value of work actually done and in its permanent place; and on or about the sixth day of each month, seventy-five per cent. of the estimated value of the work done the previous month will be paid the contractor; the remaining twenty-five per cent. being reserved as security for the faithful completion of the whole work.

STATEMENT OF QUANTITIES OF MATERIAL IN THE OUTERMOST CRIB.

38,814 cubic feet of white pine timber.
3,500 " " " oak "
20,251 ft. bd. mr. of white pine 2 inch plank.

1,700	wrought	iron	$1\frac{5}{16}$	in.	square	bolts	30	inches	long.
120	“	“	1	“	“	“	“	“	“
200	“	“	1½	“	round	“	13½	feet	“
50	“	“	“	“	“	“	18	inches	“

200 square feet of 1 in. angle iron.
6,025 cubic yards of stone filling,
Besides 6 inch spikes, and paddle and other gates.

AGREEMENT TO CONSTRUCT TUNNEL.

This agreement, made and concluded this twentieth day of October, A. D. 1863, between James J. Dull and James Gowen, both of the city of Harrisburg and State of Pennsylvania, party of the first part, and the City of Chicago of the second part:

Witnesseth, That the said party of the first part, for and in consideration of the payments to be to them made by the said city of Chicago, as hereinafter set forth, hereby covenant and agree to construct, complete, and put in readiness for use, and keep in perfect repair for one year after the same shall have been faithfully completed to the satisfaction of the Board of Public Works of said city, a tunnel from the lot now occupied by the pumping works of the Chicago Water Works, and extending two miles out under Lake Michigan, with the appurtenances to the same, and to take the risk of all disturbing causes and obstacles which may occur in the construction of said tunnel and appurtenances, and in keeping the same in perfect repair for one year, whether under or above ground, from irruption of waters, springs, quicksands, rocks, waves, winds or storms, or of any other nature or kind; the said contractors hereby agreeing to furnish all the materials of every kind required in the construction and completion of the work covered by this contract, the compensation for the said materials being included in the sum herein specified as the contract price; and they also agree to furnish, at their own proper cost and charges, all machinery, fixtures, structures, and tools of every kind needed or used in the same, and without charge to the city, except for such machinery, fixtures, structures and tools as may be specially ordered by the Board of Public Works for the doing of any extra work herein referred to. Said work to be done in accordance with plans and specifications prepared for the doing of the same, which plans are on file in the office of the Board of Public Works of said city; and the specifications are appended hereto, and made part of this contract; said work to be finished and fully completed on or before the first day of November, A. D. 1865.

All the work shall be executed in the best and most workmanlike manner, and no improper material shall be used, but all materials of every kind shall fully answer the specifications, or, if not particularly specified, shall be suitable for the place where used.

Should the Board of Public Works deem it proper or necessary, in the execution of the work, to make any alterations which shall increase or diminish the expense, such alterations shall not vitiate or annul the contract or agreement hereby entered into, but the said Board shall determine the value of the work so added or omitted, such value to be added to or deducted from the contract price, as the case may be.

The whole of the work shall be commenced and carried on when and where the Board of Public Works shall direct. Should the weather be unusually wet, or so cold and frosty that any part of the work cannot be done in a proper manner, or with due regard to durability, then the Board of Public Works may order such part of the work to be suspended altogether until a more suitable season, in which case the party of the first part will cover and otherwise sufficiently protect the several parts of the works, so that they will not be injured by the weather.

This agreement shall not be assigned nor any part of the work subcontracted, without the written consent of said Board endorsed hereon.

It is hereby provided and agreed, that if in any event the said party of the first part shall be unable to proceed with the work in accordance with the requirements and conditions of this agreement, that the said city, by its Board of Public Works, shall have full right and authority to take the work out of the hands of the said party of the first part, and to employ other workmen to complete the unfinished work, and to deduct the expense thereof from any money that may be due and owing to said party of the first part on account of the work.

And the said party of the first part covenant and agree to perform all of said work under the immediate direction and superintendence of the Board of Public Works of the city of Chicago, and to their entire satisfaction, approval and acceptance. All material used and all labor performed shall be subject to the inspection and the approval or rejection of said Board; and the said city of Chicago hereby reserves to its Board of Public Works the right finally to decide all questions arising as to the proper performance of said work; and in particular the right to decide whether any one or more of the four cribs herein provided for, with their cast iron cylinder shafts and appurtenances, may be omitted by said contractors; and in case of improper construction, to suspend said work at any time, and re-let the same; or to order the entire reconstruction of said work if improperly done; or re-let the same to some more capable and faithful contractor or contractors, and to adjust the difference of damages or price, (if any there be,) which the contractor or contractors failing to properly construct such work, in such case of default, should, in their opinion, pay to the city, according to the just and reasonable interpretation of this contract. And it is understood and agreed that no claim whatever will be made by the said party of the first part for extra work or material, or for a greater amount of money than is herein stipulated to be paid, unless some changes in or additions to said work, requiring additional outlay by said party of the first part, shall first have been ordered, in writing, by the said Board of Public Works.

The said city of Chicago hereby covenants and agrees, in consideration of the covenants and agreements in this contract specified, to be kept and performed by the said party of the first part, to pay to said party of the first part, when this contract shall be wholly carried out and completed, the sum of three hundred and fifteen thousand one hundred and thirty-nine dollars, ($315,139,) and for each foot of height that any one of the cribs for the protection of the lake shafts shall be built above the height stated in said plans and specifications, the sum of eight hundred and fifty dollars, ($850,) and for each pound of addition made to the cast iron cylinders for the like shafts above that stated in the plans and specifications, the sum of twelve (12) cents. It is also agreed that during the progress of the work, monthly estimates will be made by the Board of Public Works of the value of the work done and in its permanent place, and that seventy-five (75) per cent. of the amount of such estimates will be paid to the said contractors as they shall be issued, and that the remaining twenty-five (25) per cent. shall be reserved as security for the faithful completion of the whole work, and shall be paid when this contract is completed, and the work accepted by the said Board. It is further mutually agreed by the parties hereto, that nothing hereinbefore contained shall be so construed as to hold the said parties of the first part responsible for any accident or injury that may happen to either of the cribs or lake shafts mentioned in said specifications, after the same shall have been duly fixed and secured in their place, in consequence of any defect or insufficiency inherent in the original plan or design for the same, and not attributable in any degree to any defect or imperfection in the execution of said work by the said parties of the first part.

In testimony whereof, the said party of the first part have hereto set their hands and seals, and the said city of Chicago has caused the signatures of the Commissioners of its Board of Public Works to be hereto affixed, the day and year first above written.

[Signed] J. J. DULL, [SEAL.]
JAMES GOWEN, [SEAL.]

J. G. GINDELE,
FRED. LETZ,
O. J. ROSE,
F. C. SHERMAN,
} Commissioners of the Board of Public Works.

ACT OF CONGRESS SANCTIONING THE PROPOSED ERECTION OF PIERS IN LAKE MICHIGAN.

AN ACT DECLARING THE ASSENT OF CONGRESS TO AN ACT OF THE LEGISLATURE OF THE STATE OF ILLINOIS, THEREIN NAMED.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That the consent of Congress is hereby given to the operation of the eleventh section, chapter fifteen, of the act of the General Assembly of the State of Illinois, approved February thirteenth, eighteen hundred and sixty-three, entitled "An act to reduce the charter of the city of Chicago, and the several acts amendatory thereof, into one act, and to revise the same," which section is as follows:

"Said city shall have the power to extend aqueducts or inlet pipes into Lake Michigan, so far as may be deemed necessary to insure a supply of pure water, and to erect a pier or piers in the navigable waters of said lake, for the making, preserving and working of said pipes or aqueducts: *Provided*, that such piers shall be furnished with a beacon light, which shall be lighted at all such seasons and hours as the light on the pier at the entrance of Chicago river.

APPROVED, January 16th, 1864."

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